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60/117,393	27 January 1999 (27.01.99)	US

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(74) Agents: ROESLER, Judith, A.; Bayer Corporation, 63 North Street, Medfield, MA 02052 (US) et al.

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

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(54) Title: HUMAN GENES DIFFERENTIALLY EXPRESSED IN COLORECTAL CANCER

(57) Abstract

This invention relates to novel human genes, to proteins expressed by the genes, and to variants of the proteins. The invention also relates to diagnostic assays and therapeutic agents related to the genes and proteins, including probes, antisense constructs, and antibodies. The subject nucleic acids have been found to be differentially regulated in tumor cells, particularly in colon cancer tissue.

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ZW	Zimbabwe

INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/US 99/19424

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12N15/12 A01K67/027 C07K14/47 C12Q1/68 C07K16/18
C12N15/11 G01N33/53

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C12N C12Q C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EMBL Database Hum2:SEQ ID HS23K20 Human DNA sequence from clone 23K20 on chromosome Xq25-26.2 XP002126133 compare nucleotides 37007-37027 of HS23K20 with nucleotides 513-493 in SEQ ID NO:1 ---	2,8,15, 30
X	EMBL Database Hum2:SEQ ID HS24M15 Human DNA sequence from PAC 24M15 on chromosome 1, contains tenascin-R (restrictin). 16 April 1997 XP002126134 compare nucleotides 98498-98510 of HS24M15 with nucleotides 506-494 in SEQ ID NO:1 of this application --- -/--	8,15,30

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 December 1999	05.04.2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	CUPIDO, M

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Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SCHWEINFEST C W ET AL: "Subtraction hybridization cDNA libraries from colon carcinoma and hepatic cancer" GENE ANALYSIS TECHNIQUES, vol. 7, 1 January 1990 (1990-01-01), pages 64-70, XP002089887 ISSN: 0735-0651 page 64 ---	1,18
A	VIDER B ET AL: "Human colorectal carcinogenesis is associated with deregulation of homeobox gene expression" BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS, vol. 232, no. 3, March 1997 (1997-03), pages 742-748, XP002104685 ISSN: 0006-291X page 742 ---	1
A	JAU MIN WONG ET AL: "UBIQUITIN-RIBOSOMAL PROTEIN S27A GENE OVEREXPRESSES IN HUMAN COLORECTAL CARCINOMA IS AN EARLY GROWTH RESPONSE GENE" CANCER RESEARCH, vol. 53, no. 8, 15 April 1993 (1993-04-15), pages 1916-1920, XP002024627 ISSN: 0008-5472 page 1916 ---	1
A	VAN BELZEN N ET AL: "A novel gene which is up-regulated during colon epithelial cell differentiation and down-regulated in colorectal neoplasms" LABORATORY INVESTIGATION, vol. 77, no. 1, 1 July 1997 (1997-07-01), pages 85-92, XP002089891 ISSN: 0023-6837 page 85 ---	1
A	KONDOH N ET AL.: "Differential expression of S19 ribosomal protein, laminin-binding protein, and human lymphocyte antigen class-I messenger RNAs associated with colon-carcinoma progression and differentiation" CANCER RESEARCH., vol. 52, no. 4, 15 February 1992 (1992-02-15), pages 791-796, XP002119317 BALTIMORE, US ISSN: 0008-5472 the whole document ---	1

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INTERNATIONAL SEARCH REPORT

Inter. ..ional Application No
PCT/US 99/19424

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95 11923 A (DANA FARBER CANCER INST INC) 4 May 1995 (1995-05-04) page 1, line 29 -page 6, line 17 page 19, line 7 -page 29, line 11 ---	1-6,9, 10,14, 17-25, 31-34
A	EP 0 284 362 A (ICI PLC) 28 September 1988 (1988-09-28) the whole document -----	1-25, 27-34

1

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/19424

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 26
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-25,27,28,29-34 (all partially)

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box 3.

Claims Nos.: 26

Claim 26 relates to an agent which alters the expression in a cell of a nucleic acid. As this agent has not been disclosed in the application, a meaningful search could not be performed.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Claims: 1-25, 27,28, 29-34, all partially

Invention 1:

An isolated nucleic acid comprising a nucleotide sequence which hybridizes under stringent conditions to SEQ.ID.No:1 or a sequence complementary thereto; an isolated nucleic acid, comprising a nucleotide sequence at least 80% identical to at least 15 consecutive nucleotides of SEQ.ID. No:1 or a sequence complementary thereto; an isolated nucleic acid comprising nucleotide sequence of SEQ.ID.No:1 or a sequence complementary thereto; an expression vector comprising said nucleic acids; an host cell comprising said vector; a transgenic animal having a transgene comprising said nucleic acids; a nucleic acid hybridizing to a nucleic acid probe corresponding to at least 12 consecutive nucleotides of SEQ.ID.No:1; a probe/primer hybridizing to a nucleic acid probe corresponding to at least 12 consecutive nucleotides of SEQ.ID.No:1; an isolated polypeptide encoded by said nucleic acid; an antibody that specifically binds to said polypeptide; an antisense oligonucleotide which hybridizes under stringent conditions to at least 12 consecutive nucleic acids of SEQ.ID.No:1; a test kit comprising said probe/primer; a testkit comprising said antiboda; a method for determining the phenotype of a cell comprising detecting the differential expression of a nucleic acid which hybridizes under stringent conditions to at least 12 consecutive nucleic acids of SEQ.ID. No:1 or a protein encoded by said nucleic acid; a method for determing the presence or absence of a nucleic acid which hybridizes under stringent conditions to at least 12 consecutive nucleic acids of SEQ.ID.No:1; a method for detecting a mutation in a test nucleic acid which hybridizes under stringent conditions to at least 12 consecutive nucleic acids of SEQ.ID.No:1; a method for identifying an agent which alters the level of expression in a cell of a nucleic acid which hybridizes under stringent conditions to at least 12 consecutive nucleic acids of SEQ.ID.No:1; a pharmaceutical composition comprising a nucleic acid which hybridizes under stringent conditions to at least 12 consecutive nucleic acids of SEQ.ID.No:1; a pharmaceutical composition comprising a polypeptide encoded by said nucleic acid; a method for detecting cancer using SEQ.ID.No:1 or an antibody to a protein encoded by said sequence, as a probe.

Claims: 1-25, 27,28 30-34, all partially

Inventions 2 to 35:

Idem as invention 1, wherein each invention relates to the nucleic acid encoded by SEQ.ID.Nos:2 to 35 in stead of SEQ.ID.No:1.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Claims: 8,10-14,16-22,24,25,27,29,31-34, all partially

Inventions 36 to 168:

Idem as invention 1, wherein each invention relates to the nucleic acid encoded by SEQ.ID.Nos:36 to 168 in stead of SEQ.ID.No:1.

Claims: 16-21,24,25, 27,28,31-34, all partially

Inventions 169 to 544:

Idem as invention 1, wherein each invention relates to the nucleic acid encoded by SEQ.ID.Nos:169 to 544 in stead of SEQ.ID.No:1.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 99/19424

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9511923 A	04-05-1995	CA 2175380 A	04-05-1995
		EP 0725799 A	14-08-1996
		US 5889159 A	30-03-1999
		US 5872235 A	16-02-1999
EP 0284362 A	28-09-1988	AU 625169 B	02-07-1992
		AU 1337888 A	22-09-1988
		DK 159788 A	24-09-1988
		FI 881388 A	24-09-1988
		JP 1034291 A	03-02-1989
		NO 881273 A	26-09-1988
		NZ 223985 A	28-05-1991
		PT 87055 A,B	01-04-1988
		ZA 8802082 A	28-12-1988

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(74) Agents: ROESLER, Judith, A.; Bayer Corporation, 63 North Street, Medfield, MA 02052 (US) et al.

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published

Without international search report and to be republished upon receipt of that report.

(54) Title: HUMAN GENES DIFFERENTIALLY EXPRESSED IN COLORECTAL CANCER

(57) Abstract

This invention relates to novel human genes, to proteins expressed by the genes, and to variants of the proteins. The invention also relates to diagnostic assays and therapeutic agents related to the genes and proteins, including probes, antisense constructs, and antibodies. The subject nucleic acids have been found to be differentially regulated in tumor cells, particularly in colon cancer tissue.

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HUMAN GENES DIFFERENTIALLY EXPRESSED IN COLORECTAL CANCER

Related Application Information

This application is based on Provisional Application Nos. 60/117,393, filed January 27, 1999, and 60/098,639, filed August 31, 1998, which are incorporated herein by reference in their entirety.

Field of the Invention

The present invention provides nucleic acid sequences and proteins encoded thereby, as well as probes derived from the nucleic acid sequences, antibodies directed to the encoded proteins, and diagnostic methods for detecting cancerous cells, especially colon cancer cells.

Background of the Invention

Colorectal carcinoma is a malignant neoplastic disease. There is a high incidence of colorectal carcinoma in the Western world, particularly in the United States. Tumors of this type often metastasize through lymphatic and vascular channels. Many patients with colorectal carcinoma eventually die from this disease. In fact, it is estimated that 62,000 persons in the United States alone die of colorectal carcinoma annually.

However, if diagnosed early, colon cancer may be treated effectively by surgical removal of the cancerous tissue. Colorectal cancers originate in the colorectal epithelium and typically are not extensively vascularized (and therefore not invasive) during the early stages of development. Colorectal cancer is thought to result from the clonal expansion of a single mutant cell in the epithelial lining of the colon or rectum. The transition to a highly vascularized, invasive and ultimately metastatic cancer which spreads throughout the body commonly takes ten years or longer. If the cancer is detected prior to invasion, surgical removal of the cancerous tissue is an effective cure. However, colorectal cancer is often detected only upon manifestation of clinical symptoms, such as pain and black tarry stool. Generally, such symptoms are present only when the disease is well established, often after metastasis has occurred, and the

prognosis for the patient is poor, even after surgical resection of the cancerous tissue. Early detection of colorectal cancer therefore is important in that detection may significantly reduce its morbidity.

Invasive diagnostic methods such as endoscopic examination allow for direct visual identification, removal, and biopsy of potentially cancerous growths such as polyps. Endoscopy is expensive, uncomfortable, inherently risky, and therefore not a practical tool for screening populations to identify those with colorectal cancer. Non-invasive analysis of stool samples for characteristics indicative of the presence of colorectal cancer or precancer is a preferred alternative for early diagnosis, but no known diagnostic method is available which reliably achieves this goal. A reliable, non-invasive, and accurate technique for diagnosing colon cancer at an early stage would help save many lives.

Summary of the Invention

The present invention provides nucleic acid sequences and proteins encoded thereby, as well as probes derived from the nucleic acid sequences, antibodies directed to the encoded proteins, and diagnostic methods for detecting cancerous cells, especially colon cancer cells. The sequences disclosed herein have been found to be differentially expressed in samples obtained from colon cancer cell lines and/or colon cancer tissue. The 544 sequences that were obtained were analyzed by "blasting" the sequences against the publicly available databases; based upon the Blast search results it was found that SEQ ID Nos: 1-35 contained novel sequences, SEQ ID Nos: 36-168 contained EST sequences and SEQ ID Nos: 169-544 contained known sequences.

In one aspect, the invention provides an isolated nucleic acid comprising a nucleotide sequence which hybridizes under stringent conditions to a sequence of SEQ ID Nos. 1-544 or a sequence complementary thereto. In a related embodiment, the nucleic acid is at least about 80% or about 100% identical to a sequence corresponding to at least about 12, at least about 15, at least about 25, or at least about 40 consecutive nucleotides up to the full length of one of SEQ ID Nos. 1-544 or a sequence complementary thereto or up to the full length of the gene of which said sequence is a fragment. In certain embodiments, a nucleic acid of the present invention includes at least about five, at least about ten, or at least about twenty

nucleic acids from a region designated as novel in Table 2. In certain other embodiments, a nucleic acid of the present invention includes at least about five, at least about ten, or at least about twenty nucleotides which are not included in corresponding clones whose accession numbers are listed in Table 2.

In another aspect, the invention provides an isolated nucleic acid comprising a nucleotide sequence which hybridizes under stringent conditions to a sequence of SEQ ID Nos. 1-168, preferably SEQ ID Nos. 1-35, or a sequence complementary thereto. In a related embodiment, the nucleic acid is at least about 80% or about 100% identical to a sequence corresponding to at least about 12, at least about 15, at least about 25, or at least about 40 consecutive nucleotides up to the full length of one of SEQ ID Nos. 1-168, preferably SEQ ID Nos. 1-35 or a sequence complementary thereto or up to the full length of the gene of which said sequence is a fragment. In certain embodiments, a nucleic acid of the present invention includes at least about five, at least about ten, or at least about twenty nucleic acids from a region designated as novel in Table 2. In certain other embodiments, a nucleic acid of the present invention includes at least about five, at least about ten, or at least about twenty nucleotides which are not included in corresponding clones whose accession numbers are listed in Table 2.

In one embodiment, the invention provides a nucleic acid comprising a nucleotide sequence which hybridizes under stringent conditions to a sequence of SEQ ID Nos. 1-168, preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, and a transcriptional regulatory sequence operably linked to the nucleotide sequence to render the nucleotide sequence suitable for use as an expression vector. In another embodiment, the nucleic acid may be included in an expression vector capable of replicating in a prokaryotic or eukaryotic cell. In a related embodiment, the invention provides a host cell transfected with the expression vector.

In another embodiment, the invention provides a transgenic animal having a transgene of a nucleic acid comprising a nucleotide sequence which hybridizes under stringent conditions to a sequence of SEQ ID Nos. 1-168, preferably SEQ ID Nos 1-35, or a sequence complementary thereto incorporated in cells thereof. The transgene modifies the level of expression of the nucleic acid, the stability of a mRNA transcript of the nucleic acid, or the activity of the encoded product of the nucleic acid.

In yet another embodiment, the invention provides substantially pure nucleic acid which hybridizes under stringent conditions to a nucleic acid probe corresponding to at least about 12, at least about 15, at least about 25, or at least about 40 consecutive nucleotides up to the full length of one of SEQ ID Nos. 1-168, preferably SEQ ID Nos 1-35, or a sequence complementary thereto or up to the full length of the gene of which said sequence is a fragment. The invention also provides an antisense oligonucleotide analog which hybridizes under stringent conditions to at least 12, at least 25, or at least 50 consecutive nucleotides of one of SEQ ID Nos. 1-544 up to the full length of one of SEQ ID Nos. 1-544 or a sequence complementary thereto or up to the full length of the gene of which said sequence is a fragment, and which is resistant to cleavage by a nuclease, preferably an endogenous endonuclease or exonuclease.

In another embodiment, the invention provides a probe/primer comprising a substantially purified oligonucleotide, said oligonucleotide containing a region of nucleotide sequence which hybridizes under stringent conditions to at least about 12, at least about 15, at least about 25, or at least about 40 consecutive nucleotides of sense or antisense sequence selected from SEQ ID Nos. 1-168 up to the full length of one of SEQ ID Nos. 1-168 or a sequence complementary thereto or up to the full length of the gene of which said sequence is a fragment. In preferred embodiments, the probe selectively hybridizes with a target nucleic acid. In another embodiment, the probe may include a label group attached thereto and able to be detected. The label group may be selected from radioisotopes, fluorescent compounds, enzymes, and enzyme co-factors. The invention further provides arrays of at least about 10, at least about 25, at least about 50, or at least about 100 different probes as described above attached to a solid support.

In yet another embodiment, the invention pertains to a method of determining the phenotype of a cell, comprising detecting the differential expression, relative to a normal cell, of at least one nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-544, wherein the nucleic acid is differentially expressed by at least a factor of two, at least a factor of five, at least a factor of twenty, or at least a factor of fifty.

In another aspect, the invention provides polypeptides encoded by the subject nucleic acids. In one embodiment, the invention pertains to a polypeptide including an

amino acid sequence encoded by a nucleic acid comprising a nucleotide sequence which hybridizes under stringent conditions to a sequence of SEQ ID Nos. 1-168 or a sequence complementary thereto, or a fragment comprising at least about 25, or at least about 40 amino acids thereof. Further provided are antibodies immunoreactive with these polypeptides.

In still another aspect, the invention provides diagnostic methods. In one embodiment, the invention pertains to a method for determining the phenotype of cells from a patient by providing a nucleic acid probe comprising a nucleotide sequence having at least 12, at least about 15, at least about 25, or at least about 40 consecutive nucleotides represented in a sequence of SEQ ID Nos. 1-544 up to the full length of one of SEQ ID Nos. 1-544 or a sequence complementary thereto or up to the full length of the gene of which said sequence is a fragment, obtaining a sample of cells from a patient, providing a second sample of cells substantially all of which are non-cancerous, contacting the nucleic acid probe under stringent conditions with mRNA of each of said first and second cell samples, and comparing (a) the amount of hybridization of the probe with mRNA of the first cell sample, with (b) the amount of hybridization of the probe with mRNA of the second cell sample, wherein a difference of at least a factor of two, at least a factor of five, at least a factor of twenty, or at least a factor of fifty in the amount of hybridization with the mRNA of the first cell sample as compared to the amount of hybridization with the mRNA of the second cell sample is indicative of the phenotype of cells in the first cell sample. Determining the phenotype includes determining the genotype, as the term is used herein.

In another embodiment, the invention provides a test kit for identifying an transformed cells, comprising a probe/primer as described above, for measuring a level of a nucleic acid which hybridizes under stringent conditions to a nucleic acid of SEQ ID Nos. 1-544 in a sample of cells isolated from a patient. In certain embodiments, the kit may further include instructions for using the kit, solutions for suspending or fixing the cells, detectable tags or labels, solutions for rendering a nucleic acid susceptible to hybridization, solutions for lysing cells, or solutions for the purification of nucleic acids.

In another embodiment, the invention provides a method of determining the phenotype of a cell, comprising detecting the differential expression, relative to a normal cell, of at least one protein encoded by a nucleic acid which hybridizes under

stringent conditions to one of SEQ ID Nos. 1-544, wherein the protein is differentially expressed by at least a factor of two, at least a factor of five, at least a factor of twenty, or at least a factor of fifty. In one embodiment, the level of the protein is detected in an immunoassay. The invention also pertains to a method for determining the presence or absence of a nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-168 in a cell, comprising contacting the cell-with a probe as described above. The invention further provides a method for determining the presence or absence of a subject polypeptide encoded by a nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-168 in a cell, comprising contacting the cell with an antibody as described above. In yet another embodiment, the invention provides a method for determining the presence of an aberrant mutation (e.g., deletion, insertion, or substitution of nucleic acids) or aberrant methylation in a gene which hybridizes under stringent conditions to a sequence of SEQ ID Nos. 1-168 or a sequence complementary thereto, comprising collecting a sample of cells from a patient, isolating nucleic acid from the cells of the sample, contacting the nucleic acid sample with one or more primers which specifically hybridize to a nucleic acid sequence of SEQ ID Nos. 1-544 under conditions such that hybridization and amplification of the nucleic acid occurs, and comparing the presence, absence, or size of an amplification product to the amplification product of a normal cell.

In one embodiment, the invention provides a test kit for identifying transformed cells, comprising an antibody specific for a protein encoded by a nucleic acid which hybridizes under stringent conditions to any one of SEQ Nos. 1-544. In certain embodiments, the kit further includes instructions for using the kit. In certain embodiments, the kit may further include instructions for using the kit, solutions for suspending or fixing the cells, detectable tags or labels, solutions for rendering a polypeptide susceptible to the binding of an antibody, solutions for lysing cells, or solutions for the purification of polypeptides.

In yet another aspect, the invention provides pharmaceutical compositions including the subject nucleic acids. In one embodiment, an agent which alters the level of expression in a cell of a nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-544 or a sequence complementary thereto is identified by providing a cell, treating the cell with a test agent, determining the level

of expression in the cell of a nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-544 or a sequence complementary thereto, and comparing the level of expression of the nucleic acid in the treated cell with the level of expression of the nucleic acid in an untreated cell, wherein a change in the level of expression of the nucleic acid in the treated cell relative to the level of expression of the nucleic acid in the untreated cell is indicative of an agent which alters the level of expression of the nucleic acid in a cell. The invention further provides a pharmaceutical composition comprising an agent identified by this method. In another embodiment, the invention provides a pharmaceutical composition which includes a polypeptide encoded by a nucleic acid having a nucleotide sequence that hybridizes under stringent conditions to one of SEQ ID Nos. 1-544 or a sequence complementary thereto. In one embodiment, the invention pertains to a pharmaceutical composition comprising a nucleic acid including a sequence which hybridizes under stringent conditions to one of SEQ ID Nos. 1-544 or a sequence complementary thereto.

Brief Description of the Figure

The figure depicts an exemplary assay result for determining differential expression of gene products in cells.

Detailed Description of the Invention

The invention relates to nucleic acids having the disclosed nucleotide sequences (SEQ ID Nos. 1-544), as well as full length cDNA, mRNA, and genes corresponding to these sequences, and to polypeptides and proteins encoded by these nucleic acids and genes, and portions thereof.

Also included are polypeptides and proteins encoded by the nucleic acids of SEQ ID Nos. 1-544. The various nucleic acids that can encode these polypeptides and proteins differ because of the degeneracy of the genetic code, in that most amino acids are encoded by more than one triplet codon. The identity of such codons is well known in this art, and this information can be used for the construction of the nucleic acids within the scope of the invention.

Nucleic acids encoding polypeptides and proteins that are variants of the polypeptides and proteins encoded by the nucleic acids and related cDNA and genes are also within the scope of the invention. The variants differ from wild-type protein in having one or more amino acid substitutions that either enhance, add, or diminish a

biological activity of the wild-type protein. Once the amino acid change is selected, a nucleic acid encoding that variant is constructed according to the invention.

The following detailed description discloses how to obtain or make full-length cDNA and human genes corresponding to the nucleic acids, how to express these nucleic acids and genes, how to identify structural motifs of the genes, how to identify the function of a protein encoded by a gene corresponding to an nucleic acid, how to use nucleic acids as probes in mapping and in tissue profiling, how to use the corresponding polypeptides and proteins to raise antibodies, and how to use the nucleic acids, polypeptides, and proteins for therapeutic and diagnostic purposes.

The sequences investigated herein have been found to be differentially expressed in samples obtained from colon cancer tissue. However, it is also believed that these sequences may also have utility with other types of cancer. In a related application, PCT/IB99/01062, filed June 9, 1999, the inventors disclosed nucleic acid sequences that are differentially expressed in colon cancer-derived cell lines, such as SW 480, relative to the expression levels in normal tissue, e.g., normal colon tissue and/or normal non-colon tissue. In this application, Table 3 lists nucleic acid sequences which are over-expressed in both cancer cell line SW 480 as well colon cancer tissue obtained from various patients.

Accordingly, certain aspects of the present invention relate to nucleic acids differentially expressed in tumor tissue, especially colon cancer cell lines, polypeptides encoded by such nucleic acids, and antibodies immunoreactive with these polypeptides, and preparations of such compositions. Moreover, the present invention provides diagnostic and therapeutic assays and reagents for detecting and treating disorders involving, for example, aberrant expression of the subject nucleic acids.

I. General

This invention relates in part to novel methods for identifying and/or classifying cancerous cells present in a human tumors, particularly in solid tumors, e.g., carcinomas and sarcomas, such as, for example, breast or colon cancers. The method uses genes that are differentially expressed in cancer cell lines and/or cancer tissue compared with related normal cells, such as normal colon cells, and thereby

identifies or classifies tumor cells by the upregulation and/or downregulation of expression of particular genes, an event which is implicated in tumorigenesis.

Upregulation or increased expression of certain genes such as oncogenes, act to promote malignant growth. Downregulation or decreased expression of genes such as tumor suppressor genes also promotes malignant growth. Thus, alteration in the expression of either type of gene is a potential diagnostic indicator for determining whether a subject is at risk of developing or has cancer, e.g., colon cancer.

Accordingly, in one aspect, the invention also provides biomarkers, such as nucleic acid markers, for human tumor cells, e.g., for colon cancer cells. The invention also provides proteins encoded by these nucleic acid markers.

The invention also features methods for identifying drugs useful for treatment of such cancer cells, and for treatment of a cancerous condition, such as colon cancer. Unlike prior methods, the invention provides a means for identifying cancer cells at an early stage of development, so that premalignant cells can be identified prior to their spreading throughout the human body. This allows early detection of potentially cancerous conditions, and treatment of those cancerous conditions prior to spread of the cancerous cells throughout the body, or prior to development of an irreversible cancerous condition.

II. Definitions

For convenience, the meaning of certain terms and phrases used in the specification, examples, and appended claims, are provided below.

The term "an aberrant expression", as applied to a nucleic acid of the present invention, refers to level of expression of that nucleic acid which differs from the level of expression of that nucleic acid in healthy tissue, or which differs from the activity of the polypeptide present in a healthy subject. An activity of a polypeptide can be aberrant because it is stronger than the activity of its native counterpart. Alternatively, an activity can be aberrant because it is weaker or absent relative to the activity of its native counterpart. An aberrant activity can also be a change in the activity; for example, an aberrant polypeptide can interact with a different target peptide. A cell can have an aberrant expression level of a gene due to overexpression or underexpression of that gene.

The term "agonist", as used herein, is meant to refer to an agent that mimics or upregulates (e.g., potentiates or supplements) the bioactivity of a protein. An agonist can be a wild-type protein or derivative thereof having at least one bioactivity of the wild-type protein. An agonist can also be a compound that upregulates expression of a gene or which increases at least one bioactivity of a protein. An agonist can also be a compound which increases the interaction of a polypeptide with another molecule, e.g., a target peptide or nucleic acid.

The term "allele", which is used interchangeably herein with "allelic variant", refers to alternative forms of a gene or portions thereof. Alleles occupy the same locus or position on homologous chromosomes. When a subject has two identical alleles of a gene, the subject is said to be homozygous for that gene or allele. When a subject has two different alleles of a gene, the subject is said to be heterozygous for the gene. Alleles of a specific gene can differ from each other in a single nucleotide, or several nucleotides, and can include substitutions, deletions, and/or insertions of nucleotides. An allele of a gene can also be a form of a gene containing mutations.

The term "allelic variant of a polymorphic region of a gene" refers to a region of a gene having one of several nucleotide sequences found in that region of the gene in other individuals.

"Antagonist" as used herein is meant to refer to an agent that downregulates (e.g., suppresses or inhibits) at least one bioactivity of a protein. An antagonist can be a compound which inhibits or decreases the interaction between a protein and another molecule, e.g., a target peptide or enzyme substrate. An antagonist can also be a compound that downregulates expression of a gene or which reduces the amount of expressed protein present.

The term "antibody" as used herein is intended to include whole antibodies, e.g., of any isotype (IgG, IgA, IgM, IgE, etc), and includes fragments thereof which are also specifically reactive with a vertebrate, e.g., mammalian, protein. Antibodies can be fragmented using conventional techniques and the fragments screened for utility in the same manner as described above for whole antibodies. Thus, the term includes segments of proteolytically-cleaved or recombinantly-prepared portions of an antibody molecule that are capable of selectively reacting with a certain protein. Nonlimiting examples of such proteolytic and/or recombinant fragments include Fab, F(ab')2, Fab', Fv, and single chain antibodies (scFv) containing a V[L] and/or V[H]

domain joined by a peptide linker. The scFv's may be covalently or non-covalently linked to form antibodies having two or more binding sites. The subject invention includes polyclonal, monoclonal, or other purified preparations of antibodies and recombinant antibodies.

The phenomenon of "apoptosis" is well known, and can be described as a programmed death of cells. As is known, apoptosis is contrasted with "necrosis", a phenomenon when cells die as a result of being killed by a toxic material, or other external effect. Apoptosis involves chromatic condensation, membrane blebbing, and fragmentation of DNA, all of which are generally visible upon microscopic examination.

A disease, disorder, or condition "associated with" or "characterized by" an aberrant expression of a nucleic acid refers to a disease, disorder, or condition in a subject which is caused by, contributed to by, or causative of an aberrant level of expression of a nucleic acid.

As used herein the term "bioactive fragment of a polypeptide" refers to a fragment of a full-length polypeptide, wherein the fragment specifically agonizes (mimics) or antagonizes (inhibits) the activity of a wild-type polypeptide. The bioactive fragment preferably is a fragment capable of interacting with at least one other molecule, e.g., protein, small molecule, or DNA, which a full length protein can bind.

"Biological activity" or "bioactivity" or "activity" or "biological function", which are used interchangeably, herein mean an effector or antigenic function that is directly or indirectly performed by a polypeptide (whether in its native or denatured conformation), or by any subsequence thereof. Biological activities include binding to polypeptides, binding to other proteins or molecules, activity as a DNA binding protein, as a transcription regulator, ability to bind damaged DNA, etc. A bioactivity can be modulated by directly affecting the subject polypeptide. Alternatively, a bioactivity can be altered by modulating the level of the polypeptide, such as by modulating expression of the corresponding gene.

The term "biomarker" refers a biological molecule, e.g., a nucleic acid, peptide, hormone, etc., whose presence or concentration can be detected and correlated with a known condition, such as a disease state.

"Cells," "host cells", or "recombinant host cells" are terms used interchangeably herein. It is understood that such terms refer not only to the particular subject cell but to the progeny or potential progeny of such a cell. Because certain modifications may occur in succeeding generations due to either mutation or environmental influences, such progeny may not, in fact, be identical to the parent cell, but are still included within the scope of the term as used herein.

A "chimeric polypeptide" or "fusion polypeptide" is a fusion of a first amino acid sequence encoding one of the subject polypeptides with a second amino acid sequence defining a domain (e.g., polypeptide portion) foreign to and not substantially homologous with any domain of the subject polypeptide. A chimeric polypeptide may present a foreign domain which is found (albeit in a different polypeptide) in an organism which also expresses the first polypeptide, or it may be an "interspecies," "intergenic," etc., fusion of polypeptide structures expressed by different kinds of organisms. In general, a fusion polypeptide can be represented by the general formula $(X)_n$-$(Y)_m$-$(Z)_n$, wherein Y represents a portion of the subject polypeptide, and X and Z are each independently absent or represent amino acid sequences which are not related to the native sequence found in an organism, or which are not found as a polypeptide chain contiguous with the subject sequence, where m is an integer greater than or equal to one, and each occurrence of n is, independently, 0 or an integer greater than or equal to 1 (n and m are preferably no greater than 5 or 10).

A "delivery complex" shall mean a targeting means (e.g., a molecule that results in higher affinity binding of a nucleic acid, protein, polypeptide or peptide to a target cell surface and/or increased cellular or nuclear uptake by a target cell). Examples of targeting means include: sterols (e.g., cholesterol), lipids (e.g., a cationic lipid, virosome or liposome), viruses (e.g., adenovirus, adeno-associated virus, and retrovirus), or target cell-specific binding agents (e.g., ligands recognized by target cell specific receptors). Preferred complexes are sufficiently stable *in vivo* to prevent significant uncoupling prior to internalization by the target cell. However, the complex is cleavable under appropriate conditions within the cell so that the nucleic acid, protein, polypeptide or peptide is released in a functional form.

As is well known, genes or a particular polypeptide may exist in single or multiple copies within the genome of an individual. Such duplicate genes may be identical or may have certain modifications, including nucleotide substitutions,

additions or deletions, which all still code for polypeptides having substantially the same activity. The term "DNA sequence encoding a polypeptide" may thus refer to one or more genes within a particular individual. Moreover, certain differences in nucleotide sequences may exist between individual organisms, which are called alleles. Such allelic differences may or may not result in differences in amino acid sequence of the encoded polypeptide yet still encode a polypeptide with the same biological activity.

The term "equivalent" is understood to include nucleotide sequences encoding functionally equivalent polypeptides. Equivalent nucleotide sequences will include sequences that differ by one or more nucleotide substitutions, additions or deletions, such as allelic variants; and will, therefore, include sequences that differ from the nucleotide sequence of the nucleic acids shown in SEQ ID NOs: 1-544 due to the degeneracy of the genetic code.

As used herein, the terms "gene", "recombinant gene", and "gene construct" refer to a nucleic acid of the present invention associated with an open reading frame, including both exon and (optionally) intron sequences.

A "recombinant gene" refers to nucleic acid encoding a polypeptide and comprising exon sequences, though it may optionally include intron sequences which are derived from, for example, a related or unrelated chromosomal gene. The term "intron" refers to a DNA sequence present in a given gene which is not translated into protein and is generally found between exons.

The term "growth" or "growth state" of a cell refers to the proliferative state of a cell as well as to its differentiative state. Accordingly, the term refers to the phase of the cell cycle in which the cell is, e.g., G0, G1, G2, prophase, metaphase, or telophase, as well as to its state of differentiation, e.g., undifferentiated, partially differentiated, or fully differentiated. Without wanting to be limited, differentiation of a cell is usually accompanied by a decrease in the proliferative rate of a cell.

"Homology" or "identity" or "similarity" refers to sequence similarity between two peptides or between two nucleic acid molecules, with identity being a more strict comparison. Homology and identity can each be determined by comparing a position in each sequence which may be aligned for purposes of comparison. When a position in the compared sequence is occupied by the same base or amino acid, then the molecules are identical at that position. A degree of homology or similarity or

identity between nucleic acid sequences is a function of the number of identical or matching nucleotides at positions shared by the nucleic acid sequences. A degree of identity of amino acid sequences is a function of the number of identical amino acids at positions shared by the amino acid sequences. A degree of homology or similarity of amino acid sequences is a function of the number of amino acids, i.e., structurally related, at positions shared by the amino acid sequences. An "unrelated" or "non-homologous" sequence shares less than 40% identity, though preferably less than 25% identity, with one of the sequences of the present invention.

The term "percent identical" refers to sequence identity between two amino acid sequences or between two nucleotide sequences. Identity can each be determined by comparing a position in each sequence which may be aligned for purposes of comparison. When an equivalent position in the compared sequences is occupied by the same base or amino acid, then the molecules are identical at that position; when the equivalent site occupied by the same or a similar amino acid residue (e.g., similar in steric and/or electronic nature), then the molecules can be referred to as homologous (similar) at that position. Expression as a percentage of homology, similarity, or identity refers to a function of the number of identical or similar amino acids at positions shared by the compared sequences. Various alignment algorithms and/or programs may be used, including FASTA, BLAST, or ENTREZ. FASTA and BLAST are available as a part of the GCG sequence analysis package (University of Wisconsin, Madison, Wis.), and can be used with, e.g., default settings. ENTREZ is available through the National Center for Biotechnology Information, National Library of Medicine, National Institutes of Health, Bethesda, Md. In one embodiment, the percent identity of two sequences can be determined by the GCG program with a gap weight of 1, e.g., each amino acid gap is weighted as if it were a single amino acid or nucleotide mismatch between the two sequences.

Other techniques for alignment are described in Methods in Enzymology, vol. 266: Computer Methods for Macromolecular Sequence Analysis (1996), ed. Doolittle, Academic Press, Inc., a division of Harcourt Brace & Co., San Diego, California, USA. Preferably, an alignment program that permits gaps in the sequence is utilized to align the sequences. The Smith-Waterman is one type of algorithm that permits gaps in sequence alignments. See Meth. Mol. Biol. 70: 173-187 (1997). Also, the GAP program using the Needleman and Wunsch alignment method can be utilized to

align sequences. An alternative search strategy uses MPSRCH software, which runs on a MASPAR computer. MPSRCH uses a Smith-Waterman algorithm to score sequences on a massively parallel computer. This approach improves ability to pick up distantly related matches, and is especially tolerant of small gaps and nucleotide sequence errors. Nucleic acid-encoded amino acid sequences can be used to search both protein and DNA databases.

Databases with individual sequences are described in Methods in Enzymology, ed. Doolittle, *supra*. Databases include Genbank, EMBL, and DNA Database of Japan (DDBJ).

Preferred nucleic acids have a sequence at least 70%, and more preferably 80% identical and more preferably 90% and even more preferably at least 95% identical to an nucleic acid sequence of a sequence shown in one of SEQ ID NOS: 1-544. Nucleic acids at least 90%, more preferably 95%, and most preferably at least about 98-99% identical with a nucleic sequence represented in one of SEQ ID NOS: 1-544 are of course also within the scope of the invention. In preferred embodiments, the nucleic acid is mammalian.

The term "interact" as used herein is meant to include detectable interactions (e.g., biochemical interactions) between molecules, such as interaction between protein-protein, protein-nucleic acid, nucleic acid-nucleic acid, and protein-small molecule or nucleic acid-small molecule in nature.

The term "isolated" as used herein with respect to nucleic acids, such as DNA or RNA, refers to molecules separated from other DNAs, or RNAs, respectively, that are present in the natural source of the macromolecule. The term isolated as used herein also refers to a nucleic acid or peptide that is substantially free of cellular material, viral material, or culture medium when produced by recombinant DNA techniques, or chemical precursors or other chemicals when chemically synthesized. Moreover, an "isolated nucleic acid" is meant to include nucleic acid fragments which are not naturally occurring as fragments and would not be found in the natural state. The term "isolated" is also used herein to refer to polypeptides which are isolated from other cellular proteins and is meant to encompass both purified and recombinant polypeptides.

The terms "modulated" and "differentially regulated" as used herein refer to both upregulation (i.e., activation or stimulation (e.g., by agonizing or potentiating))

and downregulation (i.e., inhibition or suppression (e.g., by antagonizing, decreasing or inhibiting)).

The term "mutated gene" refers to an allelic form of a gene, which is capable of altering the phenotype of a subject having the mutated gene relative to a subject which does not have the mutated gene. If a subject must be homozygous for this mutation to have an altered phenotype, the mutation is said to be recessive. If one copy of the mutated gene is sufficient to alter the genotype of the subject, the mutation is said to be dominant. If a subject has one copy of the mutated gene and has a phenotype that is intermediate between that of a homozygous and that of a heterozygous subject (for that gene), the mutation is said to be co-dominant.

The designation "N", where it appears in the accompanying Sequence Listing, indicates that the identity of the corresponding nucleotide is unknown. "N" should therefore not necessarily be interpreted as permitting substitution with any nucleotide, e.g., A, T, C, or G, but rather as holding the place of a nucleotide whose identity has not been conclusively determined.

The "non-human animals" of the invention include mammalians such as rodents, non-human primates, sheep, dog, cow, chickens, amphibians, reptiles, etc. Preferred non-human animals are selected from the rodent family including rat and mouse, most preferably mouse, though transgenic amphibians, such as members of the *Xenopus* genus, and transgenic chickens can also provide important tools for understanding and identifying agents which can affect, for example, embryogenesis and tissue formation. The term "chimeric animal" is used herein to refer to animals in which the recombinant gene is found, or in which the recombinant gene is expressed in some but not all cells of the animal. The term "tissue-specific chimeric animal" indicates that one of the recombinant genes is present and/or expressed or disrupted in some tissues but not others.

As used herein, the term "nucleic acid" refers to polynucleotides such as deoxyribonucleic acid (DNA), and, where appropriate, ribonucleic acid (RNA). The term should also be understood to include, as equivalents, analogs of either RNA or DNA made from nucleotide analogs, and, as applicable to the embodiment being described, single (sense or antisense) and double-stranded polynucleotides. ESTs, chromosomes, cDNAs, mRNAs, and rRNAs are representative examples of molecules that may be referred to as nucleic acids.

The term "nucleotide sequence complementary to the nucleotide sequence of SEQ ID NO. x" refers to the nucleotide sequence of the complementary strand of a nucleic acid strand having SEQ ID NO. x. The term "complementary strand" is used herein interchangeably with the term "complement". The complement of a nucleic acid strand can be the complement of a coding strand or the complement of a non-coding strand.

The term "polymorphism" refers to the coexistence of more than one form of a gene or portion (e.g., allelic variant) thereof. A portion of a gene of which there are at least two different forms, i.e., two different nucleotide sequences, is referred to as a "polymorphic region of a gene". A polymorphic region can be a single nucleotide, the identity of which differs in different alleles. A polymorphic region can also be several nucleotides long.

A "polymorphic gene" refers to a gene having at least one polymorphic region.

As used herein, the term "promoter" means a DNA sequence that regulates expression of a selected DNA sequence operably linked to the promoter, and which effects expression of the selected DNA sequence in cells. The term encompasses "tissue specific" promoters, i.e., promoters which effect expression of the selected DNA sequence only in specific cells (e.g., cells of a specific tissue). The term also covers so-called "leaky" promoters, which regulate expression of a selected DNA primarily in one tissue, but cause expression in other tissues as well. The term also encompasses non-tissue specific promoters and promoters that constitutively expressed or that are inducible (i.e., expression levels can be controlled).

The terms "protein", "polypeptide", and "peptide" are used interchangeably herein when referring to a gene product.

The term "recombinant protein" refers to a polypeptide of the present invention which is produced by recombinant DNA techniques, wherein generally, DNA encoding a polypeptide is inserted into a suitable expression vector which is in turn used to transform a host cell to produce the heterologous protein. Moreover, the phrase "derived from", with respect to a recombinant gene, is meant to include within the meaning of "recombinant protein" those proteins having an amino acid sequence of a native polypeptide, or an amino acid sequence similar thereto which is generated by mutations including substitutions and deletions (including truncation) of a naturally occurring form of the polypeptide.

"Small molecule" as used herein, is meant to refer to a composition, which has a molecular weight of less than about 5 kD and most preferably less than about 4 kD. Small molecules can be nucleic acids, peptides, polypeptides, peptidomimetics, carbohydrates, lipids or other organic (carbon-containing) or inorganic molecules. Many pharmaceutical companies have extensive libraries of chemical and/or biological mixtures, often fungal, bacterial, or algal extracts, which can be screened with any of the assays of the invention to identify compounds that modulate a bioactivity.

As used herein, the term "specifically hybridizes" or "specifically detects" refers to the ability of a nucleic acid molecule of the invention to hybridize to at least a portion of, for example, approximately 6, 12, 15, 20, 30, 50, 100, 150, 200, 300, 350, 400, 500, 750, or 1000 contiguous nucleotides of a nucleic acid designated in any one of SEQ ID Nos: 1-544, or a sequence complementary thereto, or naturally occurring mutants thereof, such that it has less than 15%, preferably less than 10%, and more preferably less than 5% background hybridization to a cellular nucleic acid (e.g., mRNA or genomic DNA) encoding a different protein. In preferred embodiments, the oligonucleotide probe detects only a specific nucleic acid, e.g., it does not substantially hybridize to similar or related nucleic acids, or complements thereof.

"Transcriptional regulatory sequence" is a generic term used throughout the specification to refer to DNA sequences, such as initiation signals, enhancers, and promoters, which induce or control transcription of protein coding sequences with which they are operably linked. In preferred embodiments, transcription of one of the genes is under the control of a promoter sequence (or other transcriptional regulatory sequence) which controls the expression of the recombinant gene in a cell-type in which expression is intended. It will also be understood that the recombinant gene can be under the control of transcriptional regulatory sequences which are the same or which are different from those sequences which control transcription of the naturally-occurring forms of the polypeptide.

As used herein, the term "transfection" means the introduction of a nucleic acid, e.g., via an expression vector, into a recipient cell by nucleic acid-mediated gene transfer. "Transformation", as used herein, refers to a process in which a cell's genotype is changed as a result of the cellular uptake of exogenous DNA or RNA,

and, for example, the transformed cell expresses a recombinant form of a polypeptide or, in the case of anti-sense expression from the transferred gene, the expression of the target gene is disrupted.

As used herein, the term "transgene" means a nucleic acid sequence (or an antisense transcript thereto) which has been introduced into a cell. A transgene could be partly or entirely heterologous, i.e., foreign, to the transgenic animal or cell into which it is introduced, or, is homologous to an endogenous gene of the transgenic animal or cell into which it is introduced, but which is designed to be inserted, or is inserted, into the animal's genome in such a way as to alter the genome of the cell into which it is inserted (e.g., it is inserted at a location which differs from that of the natural gene or its insertion results in a knockout). A transgene can also be present in a cell in the form of an episome. A transgene can include one or more transcriptional regulatory sequences and any other nucleic acid, such as introns, that may be necessary for optimal expression of a selected nucleic acid.

A "transgenic animal" refers to any animal, preferably a non-human mammal, bird or an amphibian, in which one or more of the cells of the animal contain heterologous nucleic acid introduced by way of human intervention, such as by transgenic techniques well known in the art. The nucleic acid is introduced into the cell, directly or indirectly by introduction into a precursor of the cell, by way of deliberate genetic manipulation, such as by microinjection or by infection with a recombinant virus. The term genetic manipulation does not include classical cross-breeding, or *in vitro* fertilization, but rather is directed to the introduction of a recombinant DNA molecule. This molecule may be integrated within a chromosome, or it may be extra-chromosomally replicating DNA. In the typical transgenic animals described herein, the transgene causes cells to express a recombinant form of one of the subject polypeptide, e.g. either agonistic or antagonistic forms. However, transgenic animals in which the recombinant gene is silent are also contemplated, as for example, the FLP or CRE recombinase dependent constructs described below. Moreover, "transgenic animal" also includes those recombinant animals in which gene disruption of one or more genes is caused by human intervention, including both recombination and antisense techniques.

The term “treating” as used herein is intended to encompass curing as well as ameliorating at least one symptom of the condition or disease.

The term "vector" refers to a nucleic acid molecule capable of transporting another nucleic acid to which it has been linked. One type of preferred vector is an episome, i.e., a nucleic acid capable of extra-chromosomal replication. Preferred vectors are those capable of autonomous replication and/or expression of nucleic acids to which they are linked. Vectors capable of directing the expression of genes to which they are operatively linked are referred to herein as "expression vectors". In general, expression vectors of utility in recombinant DNA techniques are often in the form of "plasmids" which refer generally to circular double stranded DNA loops which, in their vector form are not bound to the chromosome. In the present specification, "plasmid" and "vector" are used interchangeably as the plasmid is the most commonly used form of vector. However, the invention is intended to include such other forms of expression vectors which serve equivalent functions and which become known in the art subsequently hereto.

The term "wild-type allele" refers to an allele of a gene which, when present in two copies in a subject results in a wild-type phenotype. There can be several different wild-type alleles of a specific gene, since certain nucleotide changes in a gene may not affect the phenotype of a subject having two copies of the gene with the nucleotide changes.

III. Nucleic Acids of the Present Invention

As described below, one aspect of the invention pertains to isolated nucleic acids, variants, and/or equivalents of such nucleic acids.

Nucleic acids of the present invention have been identified as differentially expressed in tumor cells, e.g., colon cancer-derived cell lines (relative to the expression levels in normal tissue, e.g., normal colon tissue and/or normal non-colon tissue), such as SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto. In certain embodiments, the subject nucleic acids are differentially expressed by at least a factor of two, preferably at least a factor of five, even more preferably at least a factor of twenty, still more preferably at least a factor of fifty. Preferred nucleic acids include sequences identified as differentially expressed both in colon cancer cell tissue and colon cancer cell lines. In preferred embodiments, nucleic acids of the present invention are upregulated in tumor cells, especially colon cancer tissue and/or colon

cancer-derived cell lines. In another embodiment, nucleic acids of the present invention are downregulated in tumor cells, especially colon cancer tissue and/or colon cancer-derived cell lines.

Table 1 indicates those sequences which are over- or underexpressed in a colon cancer-derived cell line relative to normal tissue, and further designates those sequences which are also differentially regulated in colon cancer tissue. The designation O indicates that the corresponding sequence was overexpressed, M indicates possible overexpression, N indicates no differential expression, and U indicates underexpression.

Genes which are upregulated, such as oncogenes, or downregulated, such as tumor suppressors, in aberrantly proliferating cells may be targets for diagnostic or therapeutic techniques. For example, upregulation of the *cdc2* gene induces mitosis. Overexpression of the *myt1* gene, a mitotic deactivator, negatively regulates the activity of *cdc2*. Aberrant proliferation may thus be induced either by upregulating *cdc2* or by downregulating *myt1*. Similarly, downregulation of tumor suppressors such as *p53* and *Rb* have been implicated in tumorigenesis.

Particularly preferred polypeptides are those that are encoded by nucleic acid sequences at least about 70%, 75%, 80%, 90%, 95%, 97%, or 98% similar to a nucleic acid sequence of SEQ ID Nos. 1-544. Preferably, the nucleic acid includes all or a portion (e.g., at least about 12, at least about 15, at least about 25, or at least about 40 nucleotides) of the nucleotide sequence corresponding to the nucleic acid of SEQ ID Nos. 1-168, preferably SEQ ID Nos. 1-35, or a sequence complementary thereto.

Still other preferred nucleic acids of the present invention encode a polypeptide comprising at least a portion of a polypeptide encoded by one of SEQ ID Nos. 1-544. For example, preferred nucleic acid molecules for use as probes/primers or antisense molecules (i.e., noncoding nucleic acid molecules) can comprise at least about 12, 20, 30, 50, 60, 70, 80, 90, or 100 base pairs in length up to the length of the complete gene. Coding nucleic acid molecules can comprise, for example, from about 50, 60, 70, 80, 90, or 100 base pairs up to the length of the complete gene.

Another aspect of the invention provides a nucleic acid which hybridizes under low, medium, or high stringency conditions to a nucleic acid sequence represented by one of SEQ ID Nos. 1-168, preferably SEQ ID Nos. 1-35, or a sequence complementary thereto. Appropriate stringency conditions which promote

DNA hybridization, for example, 6.0 x sodium chloride/sodium citrate (SSC) at about 45 °C, followed by a wash of 2.0 x SSC at 50 °C, are known to those skilled in the art or can be found in Current Protocols in Molecular Biology, John Wiley & Sons, N.Y. (1989), 6.3.1-12.3.6. For example, the salt concentration in the wash step can be selected from a low stringency of about 2.0 x SSC at 50 °C to a high stringency of about 0.2 x SSC at 50 °C. In addition, the temperature in the wash step can be increased from low stringency conditions at room temperature, about 22 °C, to high stringency conditions at about 65 °C. Both temperature and salt may be varied, or temperature or salt concentration may be held constant while the other variable is changed. In a preferred embodiment, a nucleic acid of the present invention will bind to one of SEQ ID Nos. 1-168, preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, under moderately stringent conditions, for example at about 2.0 x SSC and about 40 °C. In a particularly preferred embodiment, a nucleic acid of the present invention will bind to one of SEQ ID Nos. 1-168, preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, under high stringency conditions.

In one embodiment, the invention provides nucleic acids which hybridize under low stringency conditions of 6 x SSC at room temperature followed by a wash at 2 x SSC at room temperature.

In another embodiment, the invention provides nucleic acids which hybridize under high stringency conditions of 2 x SSC at 65 °C followed by a wash at 0.2 x SSC at 65 °C.

Nucleic acids having a sequence that differs from the nucleotide sequences shown in one of SEQ ID Nos. 1-168, preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, due to degeneracy in the genetic code, are also within the scope of the invention. Such nucleic acids encode functionally equivalent peptides (i.e., a peptide having equivalent or similar biological activity) but differ in sequence from the sequence shown in the sequence listing due to degeneracy in the genetic code. For example, a number of amino acids are designated by more than one triplet. Codons that specify the same amino acid, or synonyms (for example, CAU and CAC each encode histidine) may result in "silent" mutations which do not affect the amino acid sequence of a polypeptide. However, it is expected that DNA sequence polymorphisms that do lead to changes in the amino acid sequences of the subject polypeptides will exist among mammals. One skilled in the art will appreciate that

these variations in one or more nucleotides (e.g., up to about 3-5% of the nucleotides) of the nucleic acids encoding polypeptides having an activity of a polypeptide may exist among individuals of a given species due to natural allelic variation.

Also within the scope of the invention are nucleic acids encoding splicing variants of proteins encoded by a nucleic acid of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, or natural homologs of such proteins. Such homologs can be cloned by hybridization or PCR, as further described herein.

The polynucleotide sequence may also encode for a leader sequence, e.g., the natural leader sequence or a heterologous leader sequence, for a subject polypeptide. For example, the desired DNA sequence may be fused in the same reading frame to a DNA sequence which aids in expression and secretion of the polypeptide from the host cell, for example, a leader sequence which functions as a secretory sequence for controlling transport of the polypeptide from the cell. The protein having a leader sequence is a preprotein and may have the leader sequence cleaved by the host cell to form the mature form of the protein.

The polynucleotide of the present invention may also be fused in frame to a marker sequence, also referred to herein as "Tag sequence" encoding a "Tag peptide", which allows for marking and/or purification of the polypeptide of the present invention. In a preferred embodiment, the marker sequence is a hexahistidine tag, e.g., supplied by a PQE-9 vector. Numerous other Tag peptides are available commercially. Other frequently used Tags include myc-epitopes (e.g., see Ellison et al. (1991) *J Biol Chem 266*:21150-21157) which includes a 10-residue sequence from c-myc, the pFLAG system (International Biotechnologies, Inc.), the pEZZ-protein A system (Pharmacia, NJ), and a 16 amino acid portion of the *Haemophilus influenza* hemagglutinin protein. Furthermore, any polypeptide can be used as a Tag so long as a reagent, e.g., an antibody interacting specifically with the Tag polypeptide is available or can be prepared or identified.

As indicated by the examples set out below, nucleic acids can be obtained from mRNA present in any of a number of eukaryotic cells, e.g., and are preferably obtained from metazoan cells, more preferably from vertebrate cells, and even more preferably from mammalian cells. It should also be possible to obtain nucleic acids of the present invention from genomic DNA from both adults and embryos. For

example, a gene can be cloned from either a cDNA or a genomic library in accordance with protocols generally known to persons skilled in the art. cDNA can be obtained by isolating total mRNA from a cell, e.g., a vertebrate cell, a mammalian cell, or a human cell, including embryonic cells. Double stranded cDNAs can then be prepared from the total mRNA, and subsequently inserted into a suitable plasmid or bacteriophage vector using any one of a number of known techniques. The gene can also be cloned using established polymerase chain reaction techniques in accordance with the nucleotide sequence information provided by the invention.

In certain embodiments, a nucleic acid, probe, vector, or other construct of the present invention includes at least about five, at least about ten, or at least about twenty nucleic acids from a region designated as novel in Table 2. In certain other embodiments, a nucleic acid of the present invention includes at least about five, at least about ten, or at least about twenty nucleic acids which are not included in the clones whose accession numbers are listed in Table 2.

The invention includes within its scope a polynucleotide having the nucleotide sequence of nucleic acid obtained from this biological material, wherein the nucleic acid hybridizes under stringent conditions (at least about 4 x SSC at 65 °C, or at least about 4 x SSC at 42 °C; see, for example, U.S. Patent No. 5,707,829, incorporated herein by reference) with at least 15 contiguous nucleotides of at least one of SEQ ID Nos. 1-544. By this is intended that when at least 15 contiguous nucleotides of one of SEQ ID Nos. 1-544 is used as a probe, the probe will preferentially hybridize with a gene or mRNA (of the biological material) comprising the complementary sequence, allowing the identification and retrieval of the nucleic acids of the biological material that uniquely hybridize to the selected probe. Probes from more than one of SEQ ID Nos. 1-544 will hybridize with the same gene or mRNA if the cDNA from which they were derived corresponds to one mRNA. Probes of more than 15 nucleotides can be used, but 15 nucleotides represents enough sequence for unique identification.

Because the present nucleic acids represent partial mRNA transcripts, two or more nucleic acids of the invention may represent different regions of the same mRNA transcript and the same gene. Thus, if two or more of SEQ ID Nos. 1-544 are identified as belonging to the same clone, then either sequence can be used to obtain the full-length mRNA or gene.

Nucleic acid-related polynucleotides can also be isolated from cDNA libraries. These libraries are preferably prepared from mRNA of human colon cells, more preferably, human colon cancer specific tissue, designated as the DE clones in the appended Tables. In another embodiment the nucleic acids are isolated from libraries prepared from normal colon specific tissue, designated herein as PA clones in the appended Tables. In yet another embodiment, this invention discloses nucleic acid sequences that can be isolated from both libraries prepared from a human colon adenocarcinoma cell line, SW480, as well as from libraries prepared from either normal colon specific tissue or from colon cancer specific tissue. These sequences are listed in Table 3. Alignment of SEQ ID Nos. 1-544, as described above, can indicated that a cell line or tissue source of a related protein or polynucleotide can also be used as a source of the nucleic acid-related cDNA.

Techniques for producing and probing nucleic acid sequence libraries are described, for example, in Sambrook *et al.*, "Molecular Cloning: A Laboratory Manual" (New York, Cold Spring Harbor Laboratory, 1989). The cDNA can be prepared by using primers based on a sequence from SEQ ID Nos. 1-544. In one embodiment, the cDNA library can be made from only poly-adenylated mRNA. Thus, poly-T primers can be used to prepare cDNA from the mRNA. Alignment of SEQ ID Nos. 1-544 can result in identification of a related polypeptide or polynucleotide. Some of the polynucleotides disclosed herein contains repetitive regions that were subject to masking during the search procedures. The information about the repetitive regions is discussed below.

Constructs of polynucleotides having sequences of SEQ ID Nos. 1-544 can be generated synthetically. Alternatively, single-step assembly of a gene and entire plasmid from large numbers of oligodeoxyribonucleotides is described by Stemmer et al., *Gene (Amsterdam)* (1995) *164(1)*:49-53. In this method, assembly PCR (the synthesis of long DNA sequences from large numbers of oligodeoxyribonucleotides (oligos)) is described. The method is derived from DNA shuffling (Stemmer, *Nature* (1994) *370*:389-391), and does not rely on DNA ligase, but instead relies on DNA polymerase to build increasingly longer DNA fragments during the assembly process. For example, a 1.1-kb fragment containing the TEM-1 beta-lactamase-encoding gene (bla) can be assembled in a single reaction from a total of 56 oligos, each 40 nucleotides (nt) in length. The synthetic gene can be PCR amplified and cloned in a

vector containing the tetracycline-resistance gene (Tc-R) as the sole selectable marker. Without relying on ampicillin (Ap) selection, 76% of the Tc-R colonies were Ap-R, making this approach a general method for the rapid and cost-effective synthesis of any gene.

IV. Identification of Functional and Structural Motifs of Novel-Genes Using Art-Recognized Methods

Translations of the nucleotide sequence of the nucleic acids, cDNAs, or full genes can be aligned with individual known sequences. Similarity with individual sequences can be used to determine the activity of the polypeptides encoded by the polynucleotides of the invention. For example, sequences that show similarity with a chemokine sequence may exhibit chemokine activities. Also, sequences exhibiting similarity with more than one individual sequence may exhibit activities that are characteristic of either or both individual sequences.

The full length sequences and fragments of the polynucleotide sequences of the nearest neighbors can be used as probes and primers to identify and isolate the full length sequence of the nucleic acid. The nearest neighbors can indicate a tissue or cell type to be used to construct a library for the full-length sequences of the nucleic acid.

Typically, the nucleic acids are translated in all six frames to determine the best alignment with the individual sequences. The sequences disclosed herein in the Sequence Listing are in a 5' to 3' orientation and translation in three frames can be sufficient (with a few specific exceptions as described in the Examples). These amino acid sequences are referred to, generally, as query sequences, which will be aligned with the individual sequences.

Nucleic acid sequences can be compared with known genes by any of the methods disclosed above. Results of individual and query sequence alignments can be divided into three categories: high similarity, weak similarity, and no similarity. Individual alignment results ranging from high similarity to weak similarity provide a basis for determining polypeptide activity and/or structure.

Parameters for categorizing individual results include: percentage of the alignment region length where the strongest alignment is found, percent sequence identity, and p value.

The percentage of the alignment region length is calculated by counting the number of residues of the individual sequence found in the region of strongest alignment. This number is divided by the total residue length of the query sequence to find a percentage. An example is shown below:

```
Query sequence:          ASNPERTMIPVTRVGLIRYM
                               |    ||| |||| |||
Individual sequence:     YMMTEYLAIPV.RVGLPRYM
                         1   5    10     15
```

The region of alignment begins at amino acid 9 and ends at amino acid 19. The total length of the query sequence is 20 amino acids. The percent of the alignment region length is 11/20 or 55%.

Percent sequence identity is calculated by counting the number of amino acid matches between the query and individual sequence and dividing total number of matches by the number of residues of the individual sequence found in the region of strongest alignment. For the example above, the percent identity would be 10 matches divided by 11 amino acids, or approximately 90.9%.

P value is the probability that the alignment was produced by chance. For a single alignment, the p value can be calculated according to Karlin *et al.*, Proc. Natl. Acad. Sci. 87: 2264 (1990) and Karlin *et al.*, Proc. Natl. Acad. Sci. 90: (1993). The p value of multiple alignments using the same query sequence can be calculated using an heuristic approach described in Altschul *et al.*, Nat. Genet. 6: 119 (1994). Alignment programs such as BLAST program can calculate the p value.

The boundaries of the region where the sequences align can be determined according to Doolittle, Methods in Enzymology, *supra*; BLAST or FASTA programs; or by determining the area where the sequence identity is highest.

Another factor to consider for determining identity or similarity is the location of the similarity or identity. Strong local alignment can indicate similarity even if the length of alignment is short. Sequence identity scattered throughout the length of the query sequence also can indicate a similarity between the query and profile sequences.

High Similarity

For the alignment results to be considered high similarity, the percent of the alignment region length, typically, is at least about 55% of total length query sequence; more typically, at least about 58%; even more typically; at least about 60% of the total residue length of the query sequence. Usually, percent length of the alignment region can be as much as about 62%; more usually, as much as about 64%; even more usually, as much as about 66%.

Further, for high similarity, the region of alignment, typically, exhibits at least about 75% of sequence identity; more typically, at least about 78%; even more typically; at least about 80% sequence identity. Usually, percent sequence identity can be as much as about 82%; more usually, as much as about 84%; even more usually, as much as about 86%.

The p value is used in conjunction with these methods. If high similarity is found, the query sequence is considered to have high similarity with a profile sequence when the p value is less than or equal to about 10^{-2}; more usually; less than or equal to about 10^{-3}; even more usually; less than or equal to about 10^{-4}. More typically, the p value is no more than about 10^{-5}; more typically; no more than or equal to about 10^{-10}; even more typically; no more than or equal to about 10^{-15} for the query sequence to be considered high similarity.

Weak Similarity

For the alignment results to be considered weak similarity, there is no minimum percent length of the alignment region nor minimum length of alignment. A better showing of weak similarity is considered when the region of alignment is, typically, at least about 15 amino acid residues in length; more typically, at least about 20; even more typically; at least about 25 amino acid residues in length. Usually, length of the alignment region can be as much as about 30 amino acid residues; more usually, as much as about 40; even more usually, as much as about 60 amino acid residues.

Further, for weak similarity, the region of alignment, typically, exhibits at least about 35% of sequence identity; more typically, at least about 40%; even more typically; at least about 45% sequence identity. Usually, percent sequence identity

can be as much as about 50%; more usually, as much as about 55%; even more usually, as much as about 60%.

If low similarity is found, the query sequence is considered to have weak similarity with a profile sequence when the p value is usually less than or equal to about 10^{-2}; more usually; less than or equal to about 10^{-3}; even more usually; less than or equal to about 10^{-4}. More typically, the p value is no more than about 10^{-5}; more usually; no more than or equal to about 10^{-10}; even more usually; no more than or equal to about 10^{-15} for the query sequence to be considered weak similarity.

Similarity Determined by Sequence Identity

Sequence identity alone can be used to determine similarity of a query sequence to an individual sequence and can indicate the activity of the sequence. Such an alignment, preferably, permits gaps to align sequences. Typically, the query sequence is related to the profile sequence if the sequence identity over the entire query sequence is at least about 15%; more typically, at least about 20%; even more typically, at least about 25%; even more typically, at least about 50%. Sequence identity alone as a measure of similarity is most useful when the query sequence is usually, at least 80 residues in length; more usually, 90 residues; even more usually, at least 95 amino acid residues in length. More typically, similarity can be concluded based on sequence identity alone when the query sequence is preferably 100 residues in length; more preferably, 120 residues in length; even more preferably, 150 amino acid residues in length.

Determining Activity from Alignments with Profile and Multiple Aligned Sequences

Translations of the nucleic acids can be aligned with amino acid profiles that define either protein families or common motifs. Also, translations of the nucleic acids can be aligned to multiple sequence alignments (MSA) comprising the polypeptide sequences of members of protein families or motifs. Similarity or identity with profile sequences or MSAs can be used to determine the activity of the polypeptides encoded by nucleic acids or corresponding cDNA or genes. For example, sequences that show an identity or similarity with a chemokine profile or MSA can exhibit chemokine activities.

Profiles can designed manually by (1) creating a MSA, which is an alignment of the amino acid sequence of members that belong to the family and (2) constructing

a statistical representation of the alignment. Such methods are described, for example, in Birney *et al.*, Nucl. Acid Res. 24(14): 2730-2739 (1996).

MSAs of some protein families and motifs are publicly available. For example, these include MSAs of 547 different families and motifs. These MSAs are described also in Sonnhammer *et al.*, Proteins 28: 405-420 (1997). Other sources are also available in the world wide web. A brief description of these MSAs is reported in Pascarella *et al.*, Prot. Eng. 9(3): 249-251 (1996).

Techniques for building profiles from MSAs are described in Sonnhammer *et al.*, *supra*; Birney *et al.*, *supra*; and Methods in Enzymology, vol. 266: "Computer Methods for Macromolecular Sequence Analysis," 1996, ed. Doolittle, Academic Press, Inc., a division of Harcourt Brace & Co., San Diego, California, USA.

Similarity between a query sequence and a protein family or motif can be determined by (a) comparing the query sequence against the profile and/or (b) aligning the query sequence with the members of the family or motif.

Typically, a program such as Searchwise can be used to compare the query sequence to the statistical representation of the multiple alignment, also known as a profile. The program is described in Birney *et al.*, *supra*. Other techniques to compare the sequence and profile are described in Sonnhammer *et al.*, *supra* and Doolittle, *supra*.

Next, methods described by Feng *et al.*, J. Mol. Evol. 25: 351-360 (1987) and Higgins *et al.*, CABIOS 5: 151-153 (1989) can be used align the query sequence with the members of a family or motif, also known as a MSA. Computer programs, such as PILEUP, can be used. See Feng *et al.*, *infra*.

The following factors are used to determine if a similarity between a query sequence and a profile or MSA exists: (1) number of conserved residues found in the query sequence, (2) percentage of conserved residues found in the query sequence, (3) number of frameshifts, and (4) spacing between conserved residues.

Some alignment programs that both translate and align sequences can make any number of frameshifts when translating the nucleotide sequence to produce the best alignment. The fewer frameshifts needed to produce an alignment, the stronger the similarity or identity between the query and profile or MSAs. For example, a weak similarity resulting from no frameshifts can be a better indication of activity or structure of a query sequence, than a strong similarity resulting from two frameshifts.

Preferably, three or fewer frameshifts are found in an alignment; more preferably two or fewer frameshifts; even more preferably, one or fewer frameshifts; even more preferably, no frameshifts are found in an alignment of query and profile or MSAs.

Conserved residues are those amino acids that are found at a particular position in all or some of the family or motif members. For example, most known chemokines contain four conserved cysteines. Alternatively, a position is considered conserved if only a certain class of amino acids is found in a particular position in all or some of the family members. For example, the N-terminal position may contain a positively charged amino acid, such as lysine, arginine, or histidine.

Typically, a residue of a polypeptide is conserved when a class of amino acids or a single amino acid is found at a particular position in at least about 40% of all class members; more typically, at least about 50%; even more typically, at least about 60% of the members. Usually, a residue is conserved when a class or single amino acid is found in at least about 70% of the members of a family or motif; more usually, at least about 80%; even more usually, at least about 90%; even more usually, at least about 95%.

A residue is considered conserved when three unrelated amino acids are found at a particular position in the some or all of the members; more usually, two unrelated amino acids. These residues are conserved when the unrelated amino acids are found at particular positions in at least about 40% of all class member; more typically, at least about 50%; even more typically, at least about 60% of the members. Usually, a residue is conserved when a class or single amino acid is found in at least about 70% of the members of a family or motif; more usually, at least about 80%; even more usually, at least about 90%; even more usually, at least about 95%.

A query sequence has similarity to a profile or MSA when the query sequence comprises at least about 25% of the conserved residues of the profile or MSA; more usually, at least about 30%; even more usually; at least about 40%. Typically, the query sequence has a stronger similarity to a profile sequence or MSA when the query sequence comprises at least about 45% of the conserved residues of the profile or MSA; more typically, at least about 50%; even more typically; at least about 55%.

V. Probes and Primers

The nucleotide sequences determined from the cloning of genes from tumor cells, especially colon cancer cell lines and tissues will further allow for the generation of probes and primers designed for identifying and/or cloning homologs in other cell types, e.g., from other tissues, as well as homologs from other mammalian organisms. Nucleotide sequences useful as probes/primers may include all or a portion of the sequences listed in SEQ ID Nos. 1-544 or sequences complementary thereto or sequences which hybridize under stringent conditions to all or a portion of SEQ ID Nos. 1-544. For instance, the present invention also provides a probe/primer comprising a substantially purified oligonucleotide, which oligonucleotide comprising a nucleotide sequence that hybridizes under stringent conditions to at least approximately 12, preferably 25, more preferably 40, 50, or 75 consecutive nucleotides up to the full length of the sense or anti-sense sequence selected from the group consisting of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, or naturally occurring mutants thereof. For instance, primers based on a nucleic acid represented in SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, can be used in PCR reactions to clone homologs of that sequence.

In yet another embodiment, the invention provides probes/primers comprising a nucleotide sequence that hybridizes under moderately stringent conditions to at least approximately 12, 16, 25, 40, 50 or 75 consecutive nucleotides up to the full length of the sense or antisense sequence selected from the group consisting of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or naturally occurring mutants thereof.

In particular, these probes are useful because they provide a method for detecting mutations in wild-type genes of the present invention. Nucleic acid probes which are complementary to a wild-type gene of the present invention and can form mismatches with mutant genes are provided, allowing for detection by enzymatic or chemical cleavage or by shifts in electrophoretic mobility.

Likewise, probes based on the subject sequences can be used to detect transcripts or genomic sequences encoding the same or homologous proteins, for use, for example, in prognostic or diagnostic assays. In preferred embodiments, the probe

further comprises a label group attached thereto and able to be detected, e.g., the label group is selected from radioisotopes, fluorescent compounds, chemiluminescent compounds, enzymes, and enzyme co-factors.

Full-length cDNA molecules comprising the disclosed nucleic acids are obtained as follows. A subject nucleic acid or a portion thereof comprising at least about 12, 15, 18, or 20 nucleotides up to the full length of a sequence represented in SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, may be used as a hybridization probe to detect hybridizing members of a cDNA library using probe design methods, cloning methods, and clone selection techniques as described in U.S. Patent No. 5,654,173, "Secreted Proteins and Polynucleotides Encoding Them," incorporated herein by reference. Libraries of cDNA may be made from selected tissues, such as normal or tumor tissue, or from tissues of a mammal treated with, for example, a pharmaceutical agent. Preferably, the tissue is the same as that used to generate the nucleic acids, as both the nucleic acid and the cDNA represent expressed genes. Most preferably, the cDNA library is made from the biological material described herein in the Examples. Alternatively, many cDNA libraries are available commercially. (Sambrook *et al., Molecular Cloning: A Laboratory Manual, 2nd Ed.* (Cold Spring Harbor Press, Cold Spring Harbor, NY 1989). The choice of cell type for library construction may be made after the identity of the protein encoded by the nucleic acid-related gene is known. This will indicate which tissue and cell types are likely to express the related gene, thereby containing the mRNA for generating the cDNA.

Members of the library that are larger than the nucleic acid, and preferably that contain the whole sequence of the native message, may be obtained. To confirm that the entire cDNA has been obtained, RNA protection experiments may be performed as follows. Hybridization of a full-length cDNA to an mRNA may protect the RNA from RNase degradation. If the cDNA is not full length, then the portions of the mRNA that are not hybridized may be subject to RNase degradation. This may be assayed, as is known in the art, by changes in electrophoretic mobility on polyacrylamide gels, or by detection of released monoribonucleotides. Sambrook *et al., Molecular Cloning: A Laboratory Manual, 2nd Ed.* (Cold Spring Harbor Press, Cold Spring Harbor, NY 1989). In order to obtain additional sequences 5' to the end

of a partial cDNA, 5' RACE (PCR Protocols: A Guide to Methods and Applications (Academic Press, Inc. 1990)) may be performed.

Genomic DNA may be isolated using nucleic acids in a manner similar to the isolation of full-length cDNAs. Briefly, the nucleic acids, or portions thereof, may be used as probes to libraries of genomic DNA. Preferably, the library is obtained from the cell type that was used to generate the nucleic acids. Most preferably, the genomic DNA is obtained from the biological material described herein in the Example. Such libraries may be in vectors suitable for carrying large segments of a genome, such as P1 or YAC, as described in detail in Sambrook *et al.*, 9.4-9.30. In addition, genomic sequences can be isolated from human BAC libraries, which are commercially available from Research Genetics, Inc., Huntville, Alabama, USA, for example. In order to obtain additional 5' or 3' sequences, chromosome walking may be performed, as described in Sambrook *et al.*, such that adjacent and overlapping fragments of genomic DNA are isolated. These may be mapped and pieced together, as is known in the art, using restriction digestion enzymes and DNA ligase.

Using the nucleic acids of the invention, corresponding full length genes can be isolated using both classical and PCR methods to construct and probe cDNA libraries. Using either method, Northern blots, preferably, may be performed on a number of cell types to determine which cell lines express the gene of interest at the highest rate.

Classical methods of constructing cDNA libraries are taught in Sambrook et al., supra. With these methods, cDNA can be produced from mRNA and inserted into viral or expression vectors. Typically, libraries of mRNA comprising poly(A) tails can be produced with poly(T) primers. Similarly, cDNA libraries can be produced using the instant sequences as primers.

PCR methods may be used to amplify the members of a cDNA library that comprise the desired insert. In this case, the desired insert may contain sequence from the full length cDNA that corresponds to the instant nucleic acids. Such PCR methods include gene trapping and RACE methods.

Gene trapping may entail inserting a member of a cDNA library into a vector. The vector then may be denatured to produce single stranded molecules. Next, a substrate-bound probe, such a biotinylated oligo, may be used to trap cDNA inserts of interest. Biotinylated probes can be linked to an avidin-bound solid substrate. PCR

methods can be used to amplify the trapped cDNA. To trap sequences corresponding to the full length genes, the labeled probe sequence may be based on the nucleic acids of the invention, e.g., SEQ ID Nos. 1-168, preferably SEQ ID Nos. 1-35, or a sequence complementary thereto. Random primers or primers specific to the library vector can be used to amplify the trapped cDNA. Such gene trapping techniques are described in Gruber *et al.*, PCT WO 95/04745 and Gruber *et al.*, U.S. Pat. No. 5,500,356. Kits are commercially available to perform gene trapping experiments from, for example, Life Technologies, Gaithersburg, Maryland, USA.

"Rapid amplification of cDNA ends," or RACE, is a PCR method of amplifying cDNAs from a number of different RNAs. The cDNAs may be ligated to an oligonucleotide linker and amplified by PCR using two primers. One primer may be based on sequence from the instant nucleic acids, for which full length sequence is desired, and a second primer may comprise a sequence that hybridizes to the oligonucleotide linker to amplify the cDNA. A description of this method is reported in PCT Pub. No. WO 97/19110.

In preferred embodiments of RACE, a common primer may be designed to anneal to an arbitrary adaptor sequence ligated to cDNA ends (Apte and Siebert, Biotechniques 15:890-893, 1993; Edwards et al., Nuc. Acids Res. 19:5227-5232, 1991). When a single gene-specific RACE primer is paired with the common primer, preferential amplification of sequences between the single gene specific primer and the common primer occurs. Commercial cDNA pools modified for use in RACE are available.

Another PCR-based method generates full-length cDNA library with anchored ends without specific knowledge of the cDNA sequence. The method uses lock-docking primers (I-VI), where one primer, poly TV (I-III) locks over the polyA tail of eukaryotic mRNA producing first strand synthesis and a second primer, polyGH (IV-VI) locks onto the polyC tail added by terminal deoxynucleotidyl transferase (TdT). This method is described in PCT Pub. No. WO 96/40998.

The promoter region of a gene generally is located 5' to the initiation site for RNA polymerase II. Hundreds of promoter regions contain the "TATA" box, a sequence such as TATTA or TATAA, which is sensitive to mutations. The promoter region can be obtained by performing 5' RACE using a primer from the coding region

of the gene. Alternatively, the cDNA can be used as a probe for the genomic sequence, and the region 5' to the coding region is identified by "walking up."

If the gene is highly expressed or differentially expressed, the promoter from the gene may be of use in a regulatory construct for a heterologous gene.

Once the full-length cDNA or gene is obtained, DNA encoding variants can be prepared by site-directed mutagenesis, described in detail in Sambrook *et al.*, 15.3-15.63. The choice of codon or nucleotide to be replaced can be based on the disclosure herein on optional changes in amino acids to achieve altered protein structure and/or function.

As an alternative method to obtaining DNA or RNA from a biological material, nucleic acid comprising nucleotides having the sequence of one or more nucleic acids of the invention can be synthesized. Thus, the invention encompasses nucleic acid molecules ranging in length from 12 nucleotides (corresponding to at least 12 contiguous nucleotides which hybridize under stringent conditions to or are at least 80% identical to a nucleic acid represented by one of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto) up to a maximum length suitable for one or more biological manipulations, including replication and expression, of the nucleic acid molecule. The invention includes but is not limited to (a) nucleic acid having the size of a full gene, and comprising at least one of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto; (b) the nucleic acid of (a) also comprising at least one additional gene, operably linked to permit expression of a fusion protein; (c) an expression vector comprising (a) or (b); (d) a plasmid comprising (a) or (b); and (e) a recombinant viral particle comprising (a) or (b). Construction of (a) can be accomplished as described below in part IV.

The sequence of a nucleic acid of the present invention is not limited and can be any sequence of A, T, G, and/or C (for DNA) and A, U, G, and/or C (for RNA) or modified bases thereof, including inosine and pseudouridine. The choice of sequence will depend on the desired function and can be dictated by coding regions desired, the intron-like regions desired, and the regulatory regions desired.

VI. Vectors Carrying Nucleic Acids of the Present Invention

The invention further provides plasmids and vectors, which can be used to express a gene in a host cell. The host cell may be any prokaryotic or eukaryotic cell. Thus, a nucleotide sequence derived from any one of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, encoding all or a selected portion of a protein, can be used to produce a recombinant form of an polypeptide via microbial or eukaryotic cellular processes. Ligating the polynucleotide sequence into a gene construct, such as an expression vector, and transforming or transfecting into hosts, either eukaryotic (yeast, avian, insect or mammalian) or prokaryotic (bacterial cells), are standard procedures well known in the art.

Vectors that allow expression of a nucleic acid in a cell are referred to as expression vectors. Typically, expression vectors contain a nucleic acid operably linked to at least one transcriptional regulatory sequence. Regulatory sequences are art-recognized and are selected to direct expression of the subject nucleic acids. Transcriptional regulatory sequences are described in Goeddel; Gene Expression Technology: Methods in Enzymology 185, Academic Press, San Diego, CA (1990). In one embodiment, the expression vector includes a recombinant gene encoding a peptide having an agonistic activity of a subject polypeptide, or alternatively, encoding a peptide which is an antagonistic form of a subject polypeptide.

The choice of plasmid will depend on the type of cell in which propagation is desired and the purpose of propagation. Certain vectors are useful for amplifying and making large amounts of the desired DNA sequence. Other vectors are suitable for expression in cells in culture. Still other vectors are suitable for transfer and expression in cells in a whole animal or person. The choice of appropriate vector is well within the skill of the art. Many such vectors are available commercially. The nucleic acid or full-length gene is inserted into a vector typically by means of DNA ligase attachment to a cleaved restriction enzyme site in the vector. Alternatively, the desired nucleotide sequence may be inserted by homologous recombination in vivo. Typically this is accomplished by attaching regions of homology to the vector on the flanks of the desired nucleotide sequence. Regions of homology are added by ligation of oligonucleotides, or by polymerase chain reaction using primers comprising both the region of homology and a portion of the desired nucleotide sequence.

Nucleic acids or full-length genes are linked to regulatory sequences as appropriate to obtain the desired expression properties. These may include promoters (attached either at the 5' end of the sense strand or at the 3' end of the antisense strand), enhancers, terminators, operators, repressors, and inducers. The promoters may be regulated or constitutive. In some situations it may be desirable to use conditionally active promoters, such as tissue-specific or developmental stage-specific promoters. These are linked to the desired nucleotide sequence using the techniques described above for linkage to vectors. Any techniques known in the art may be used.

When any of the above host cells, or other appropriate host cells or organisms, are used to replicate and/or express the polynucleotides or nucleic acids of the invention, the resulting replicated nucleic acid, RNA, expressed protein or polypeptide, is within the scope of the invention as a product of the host cell or organism. The product is recovered by any appropriate means known in the art.

Once the gene corresponding to the nucleic acid is identified, its expression can be regulated in the cell to which the gene is native. For example, an endogenous gene of a cell can be regulated by an exogenous regulatory sequence as disclosed in U.S. Patent No. 5,641,670, "Protein Production and Protein Delivery."

A number of vectors exist for the expression of recombinant proteins in yeast (see, for example, Broach *et al.* (1983) in Experimental Manipulation of Gene Expression, ed. M. Inouye, Academic Press, p. 83, incorporated by reference herein). In addition, drug resistance markers such as ampicillin can be used. In an illustrative embodiment, a polypeptide is produced recombinantly utilizing an expression vector generated by sub-cloning one of the nucleic acids represented in one of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto.

The preferred mammalian expression vectors contain both prokaryotic sequences, to facilitate the propagation of the vector in bacteria, and one or more eukaryotic transcription units that are expressed in eukaryotic cells. The various methods employed in the preparation of plasmids and transformation of host organisms are well known in the art. For other suitable expression systems for both prokaryotic and eukaryotic cells, as well as general recombinant procedures, see Molecular Cloning: A Laboratory Manual, 2nd Ed., ed. by Sambrook, Fritsch and Maniatis (Cold Spring Harbor Laboratory Press: 1989) Chapters 16 and 17.

When it is desirable to express only a portion of a gene, e.g., a truncation mutant, it may be necessary to add a start codon (ATG) to the oligonucleotide fragment containing the desired sequence to be expressed. It is well known in the art that a methionine at the N-terminal position can be enzymatically cleaved by the use of the enzyme methionine aminopeptidase (MAP). MAP has been cloned from E. coli (Ben-Bassat *et al.* (1987) J. Bacteriol. 169:751-757) and Salmonella typhimurium and its *in vitro* activity has been demonstrated on recombinant proteins (Miller *et al.* (1987) PNAS 84:2718-1722). Therefore, removal of an N-terminal methionine, if desired, can be achieved either *in vivo* by expressing polypeptides in a host which produces MAP (e.g., E. coli or CM89 or S. cerevisiae), or *in vitro* by use of purified MAP (e.g., procedure of Miller *et al., supra*).

Moreover, the nucleic acid constructs of the present invention can also be used as part of a gene therapy protocol to deliver nucleic acids such as antisense nucleic acids. Thus, another aspect of the invention features expression vectors for *in vivo* or *in vitro* transfection with an antisense oligonucleotide.

In addition to viral transfer methods, non-viral methods can also be employed to introduce a subject nucleic acid, e.g., a sequence represented by one of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, into the tissue of an animal. Most nonviral methods of gene transfer rely on normal mechanisms used by mammalian cells for the uptake and intracellular transport of macromolecules. In preferred embodiments, non-viral targeting means of the present invention rely on endocytic pathways for the uptake of the subject nucleic acid by the targeted cell. Exemplary targeting means of this type include liposomal derived systems, polylysine conjugates, and artificial viral envelopes.

A nucleic acid of any of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, the corresponding cDNA, or the full-length gene may be used to express the partial or complete gene product. Appropriate nucleic acid constructs are purified using standard recombinant DNA techniques as described in, for example, Sambrook *et al.*, (1989) *Molecular Cloning: A Laboratory Manual*, 2nd ed. (Cold Spring Harbor Press, Cold Spring Harbor, New York), and under current regulations described in United States Dept. of HHS, National Institute of Health (NIH) Guidelines for Recombinant

DNA Research. The polypeptides encoded by the nucleic acid may be expressed in any expression system, including, for example, bacterial, yeast, insect, amphibian and mammalian systems. Suitable vectors and host cells are described in U.S. Patent No. 5,654,173.

Bacteria. Expression systems in bacteria include those described in Chang *et al.*, *Nature* (1978) *275*:615, Goeddel *et al.*, *Nature* (1979) *281*:544; Goeddel *et al.*, *Nucleic Acids Res.* (1980) *8*:4057; EP 0 036,776, U.S. Patent No. 4,551,433, DeBoer *et al.*, *Proc. Natl. Acad. Sci. (USA)* (1983) *80*:2125, and Siebenlist *et al.*, *Cell* (1980) *20*:269.

Yeast. Expression systems in yeast include those described in Hinnen *et al.*, *Proc. Natl. Acad. Sci. (USA)* (1978) *75*:1929; Ito *et al.*, *J. Bacteriol.* (1983) *153*:163; Kurtz *et al.*, *Mol. Cell. Biol.* (1986) *6*:142; Kunze *et al.*, *J. Basic Microbiol.* (1985) *25*:141; Gleeson *et al.*, *J. Gen. Microbiol.* (1986) *132*:3459, Roggenkamp *et al.*, *Mol. Gen. Genet.* (1986) *202*:302) Das *et al.*, *J. Bacteriol.* (1984) *158*:1165; De Louvencourt *et al.*, *J. Bacteriol.* (1983) *154*:737, Van den Berg *et al.*, *Bio/Technology* (1990) *8*:135; Kunze *et al.*, *J. Basic Microbiol.* (1985) *25*:141; Cregg *et al.*, *Mol. Cell. Biol.* (1985) *5*:3376, U.S. Patent Nos. 4,837,148 and 4,929,555; Beach and Nurse, *Nature* (1981) *300*:706; Davidow *et al.*, *Curr. Genet.* (1985) *10*:380, Gaillardin *et al.*, *Curr. Genet.* (1985) *10*:49, Ballance *et al.*, *Biochem. Biophys. Res. Commun.* (1983) *112*:284289; Tilburn *et al.*, *Gene* (1983) *26*:205221, Yelton *et al.*, *Proc. Natl. Acad. Sci. (USA)* (1984) *81*:14701474, Kelly and Hynes, *EMBO J.* (1985) *4*:475479; EP 0 244,234, and WO 91/00357.

Insect Cells. Expression of heterologous genes in insects is accomplished as described in U.S. Patent No. 4,745,051, Friesen *et al.* (1986) "The Regulation of Baculovirus Gene Expression" in: The Molecular Biology Of Baculoviruses (W. Doerfler, ed.), EP 0 127,839, EP 0 155,476, and Vlak *et al.*, J. *Gen. Virol.* (1988) *69*:765776, Miller *et al.*, *Ann. Rev. Microbiol.* (1988) *42*:177, Carbonell *et al.*, *Gene* (1988) *73*:409, Maeda *et al.*, *Nature* (1985) *315*:592594, LebacqVerheyden *et al.*, *Mol. Cell. Biol.* (1988) *8*:3129; Smith *et al.*, *Proc. Natl. Acad. Sci. (USA)* (1985) *82*:8404, Miyajima *et al.*, *Gene* (1987) *58*:273; and Martin *et al.*, *DNA* (1988) *7*:99. Numerous baculoviral strains and variants and corresponding permissive insect host cells from hosts are described in Luckow *et al.*, *Bio/Technology* (1988) *6*:4755, Miller

et al., Generic Engineering (Setlow, J.K. *et al.* eds.), Vol. 8 (Plenum Publishing, 1986), pp. 277279, and Maeda *et al.*, *Nature*, (1985) *315*:592-594.

Mammalian Cells. Mammalian expression is accomplished as described in Dijkema *et al.*, *EMBO J.* (1985) *4*:761, Gorman *et al.*, *Proc. Natl. Acad. Sci. (USA)* (1982) *79*:6777, Boshart *et al.*, *Cell* (1985) *41*:521 and U.S. Patent No. 4,399,216. Other features of mammalian expression are facilitated as described in Ham and Wallace, *Meth. Enz.* (1979) *58*:44, Barnes and Sato, *Anal. Biochem*. (1980) *102*:255, U.S. Patent Nos. 4,767,704, 4,657,866, 4,927,762, 4,560,655, WO 90/103430, WO 87/00195, and U.S. RE 30,985.

VII. Therapeutic Nucleic Acid Constructs

One aspect of the invention relates to the use of the isolated nucleic acid, e.g., SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, in antisense therapy. As used herein, antisense therapy refers to administration or *in situ* generation of oligonucleotide molecules or their derivatives which specifically hybridize (e.g., bind) under cellular conditions with the cellular mRNA and/or genomic DNA, thereby inhibiting transcription and/or translation of that gene. The binding may be by conventional base pair complementarity, or, for example, in the case of binding to DNA duplexes, through specific interactions in the major groove of the double helix. In general, antisense therapy refers to the range of techniques generally employed in the art, and includes any therapy which relies on specific binding to oligonucleotide sequences.

An antisense construct of the present invention can be delivered, for example, as an expression plasmid which, when transcribed in the cell, produces RNA which is complementary to at least a unique portion of the cellular mRNA. Alternatively, the antisense construct is an oligonucleotide probe which is generated *ex vivo* and which, when introduced into the cell, causes inhibition of expression by hybridizing with the mRNA and/or genomic sequences of a subject nucleic acid. Such oligonucleotide probes are preferably modified oligonucleotides which are resistant to endogenous nucleases, e.g., exonucleases and/or endonucleases, and are therefore stable *in vivo*. Exemplary nucleic acid molecules for use as antisense oligonucleotides are phosphoramidate, phosphorothioate and methylphosphonate analogs of DNA (see also

U.S. Patents 5,176,996; 5,264,564; and 5,256,775). Additionally, general approaches to constructing oligomers useful in antisense therapy have been reviewed, for example, by Van der Krol et al. (1988) BioTechniques 6:958-976; and Stein et al. (1988) Cancer Res 48:2659-2668. With respect to antisense DNA, oligodeoxyribonucleotides derived from the translation initiation site, e.g., between the -10 and +10 regions of the nucleotide sequence of interest, are preferred.

Antisense approaches involve the design of oligonucleotides (either DNA or RNA) that are complementary to mRNA. The antisense oligonucleotides will bind to the mRNA transcripts and prevent translation. Absolute complementarity, although preferred, is not required. In the case of double-stranded antisense nucleic acids, a single strand of the duplex DNA may thus be tested, or triplex formation may be assayed. The ability to hybridize will depend on both the degree of complementarity and the length of the antisense nucleic acid. Generally, the longer the hybridizing nucleic acid, the more base mismatches with an RNA it may contain and still form a stable duplex (or triplex, as the case may be). One skilled in the art can ascertain a tolerable degree of mismatch by use of standard procedures to determine the melting point of the hybridized complex.

Oligonucleotides that are complementary to the 5' end of the mRNA, e.g., the 5' untranslated sequence up to and including the AUG initiation codon, should work most efficiently at inhibiting translation. However, sequences complementary to the 3' untranslated sequences of mRNAs have recently been shown to be effective at inhibiting translation of mRNAs as well. (Wagner, R. 1994. Nature 372:333). Therefore, oligonucleotides complementary to either the 5' or 3' untranslated, non-coding regions of a gene could be used in an antisense approach to inhibit translation of endogenous mRNA. Oligonucleotides complementary to the 5' untranslated region of the mRNA should include the complement of the AUG start codon. Antisense oligonucleotides complementary to mRNA coding regions are typically less efficient inhibitors of translation but could also be used in accordance with the invention. Whether designed to hybridize to the 5', 3', or coding region of subject mRNA, antisense nucleic acids should be at least six nucleotides in length, and are preferably less that about 100 and more preferably less than about 50, 25, 17 or 10 nucleotides in length.

Regardless of the choice of target sequence, it is preferred that *in vitro* studies are first performed to quantitate the ability of the antisense oligonucleotide to quantitate the ability of the antisense oligonucleotide to inhibit gene expression. It is preferred that these studies utilize controls that distinguish between antisense gene inhibition and nonspecific biological effects of oligonucleotides. It is also preferred that these studies compare levels of the target RNA or protein with that of an internal control RNA or protein. Additionally, it is envisioned that results obtained using the antisense oligonucleotide are compared with those obtained using a control oligonucleotide. It is preferred that the control oligonucleotide is of approximately the same length as the test oligonucleotide and that the nucleotide sequence of the oligonucleotide differs from the antisense sequence no more than is necessary to prevent specific hybridization to the target sequence.

The oligonucleotides can be DNA or RNA or chimeric mixtures or derivatives or modified versions thereof, single-stranded or double-stranded. The oligonucleotide can be modified at the base moiety, sugar moiety, or phosphate backbone, for example, to improve stability of the molecule, hybridization, etc. The oligonucleotide may include other appended groups such as peptides (e.g., for targeting host cell receptors), or agents facilitating transport across the cell membrane (see, e.g., Letsinger et al., 1989, Proc. Natl. Acad. Sci. U.S.A. 86:6553-6556; Lemaitre et al., 1987, Proc. Natl. Acad. Sci. 84:648-652; PCT Publication No. WO 88/09810, published December 15, 1988) or the blood-brain barrier (see, e.g., PCT Publication No. WO 89/10134, published April 25, 1988), hybridization-triggered cleavage agents (See, e.g., Krol et al., 1988, BioTechniques 6:958-976), or intercalating agents (See, e.g., Zon, 1988, Pharm. Res. 5:539-549). To this end, the oligonucleotide may be conjugated to another molecule, e.g., a peptide, hybridization triggered cross-linking agent, transport agent, hybridization-triggered cleavage agent, etc.

The antisense oligonucleotide may comprise at least one modified base moiety which is selected from the group including but not limited to 5-fluorouracil, 5-bromouracil, 5-chlorouracil, 5-iodouracil, hypoxanthine, xantine, 4-acetylcytosine, 5-(carboxyhydroxytriethyl) uracil, 5-carboxymethylaminomethyl-2-thiouridine, 5-carboxymethylaminomethyluracil, dihydrouracil, beta-D-galactosylqueosine, inosine, N6-isopentenyladenine, 1-methylguanine, 1-methylinosine, 2,2-dimethylguanine, 2-methyladenine, 2-methylguanine, 3-methylcytosine, 5-methylcytosine, N6-adenine,

7-methylguanine, 5-methylaminomethyluracil, 5-methoxyaminomethyl-2-thiouracil, beta-D-mannosylqueosine, 5-methoxycarboxymethyluracil, 5-methoxyuracil, 2-methylthio-N6-isopentenyladenine, uracil-5-oxyacetic acid (v), wybutoxosine, pseudouracil, queosine, 2-thiocytosine, 5-methyl-2-thiouracil, 2-thiouracil, 4-thiouracil, 5-methyluracil, uracil-5- oxyacetic acid methylester, uracil-5-oxyacetic acid (v), 5-methyl-2-thiouracil, 3-(3-amino-3-N-2-carboxypropyl) uracil, (acp3)w, and 2,6-diaminopurine.

The antisense oligonucleotide may also comprise at least one modified sugar moiety selected from the group including but not limited to arabinose, 2-fluoroarabinose, xylulose, and hexose.

The antisense oligonucleotide can also contain a neutral peptide-like backbone. Such molecules are termed peptide nucleic acid (PNA)-oligomers and are described, e.g., in Perry- O'Keefe et al. (1996) Proc. Natl. Acad. Sci. U.S.A. 93:14670 and in Eglom *et al.* (1993) Nature 365:566. One advantage of PNA oligomers is their capability to bind to complementary DNA essentially independently from the ionic strength of the medium due to the neutral backbone of the DNA. In yet another embodiment, the antisense oligonucleotide comprises at least one modified phosphate backbone selected from the group consisting of a phosphorothioate, a phosphorodithioate, a phosphoramidothioate, a phosphoramidate, a phosphordiamidate, a methylphosphonate, an alkyl phosphotriester, and a formacetal or analog thereof.

In yet a further embodiment, the antisense oligonucleotide is an α-anomeric oligonucleotide. An α-anomeric oligonucleotide forms specific double-stranded hybrids with complementary RNA in which, contrary to the usual β-units, the strands run parallel to each other (Gautier et al., 1987, Nucl. Acids Res. 15:6625-6641). The oligonucleotide is a 2'-O-methylribonucleotide (Inoue et al., 1987, Nucl. Acids Res. 15:6131-12148), or a chimeric RNA-DNA analogue (Inoue et al., 1987, FEBS Lett. 215:327-330).

Oligonucleotides of the invention may be synthesized by standard methods known in the art, e.g., by use of an automated DNA synthesizer (such as are commercially available from Biosearch, Applied Biosystems, etc.). As examples, phosphorothioate oligonucleotides may be synthesized by the method of Stein et al. (1988, Nucl. Acids Res. 16:3209), methylphosphonate olgonucleotides can be

prepared by use of controlled pore glass polymer supports (Sarin et al., 1988, Proc. Natl. Acad. Sci. U.S.A. 85:7448-7451), etc.

While antisense nucleotides complementary to a coding region sequence can be used, those complementary to the transcribed untranslated region and to the region comprising the initiating methionine are most preferred.

The antisense molecules can be delivered to cells which express the target nucleic acid *in vivo*. A number of methods have been developed for delivering antisense DNA or RNA to cells; e.g., antisense molecules can be injected directly into the tissue site, or modified antisense molecules, designed to target the desired cells (e.g., antisense linked to peptides or antibodies that specifically bind receptors or antigens expressed on the target cell surface) can be administered systemically.

However, it is often difficult to achieve intracellular concentrations of the antisense sufficient to suppress translation on endogenous mRNAs. Therefore, a preferred approach utilizes a recombinant DNA construct in which the antisense oligonucleotide is placed under the control of a strong pol III or pol II promoter. The use of such a construct to transfect target cells in the patient will result in the transcription of sufficient amounts of single stranded RNAs that will form complementary base pairs with the endogenous transcripts and thereby prevent translation of the target mRNA. For example, a vector can be introduced *in vivo* such that it is taken up by a cell and directs the transcription of an antisense RNA. Such a vector can remain episomal or become chromosomally integrated, as long as it can be transcribed to produce the desired antisense RNA. Such vectors can be constructed by recombinant DNA technology methods standard in the art. Vectors can be plasmid, viral, or others known in the art for replication and expression in mammalian cells. Expression of the sequence encoding the antisense RNA can be by any promoter known in the art to act in mammalian, preferably human cells. Such promoters can be inducible or constitutive. Such promoters include but are not limited to: the SV40 early promoter region (Bernoist and Chambon, 1981, Nature 290:304-310), the promoter contained in the 3' long terminal repeat of Rous sarcoma virus (Yamamoto *et al.*, 1980, Cell 22:787-797), the herpes thymidine kinase promoter (Wagner et al., 1981, Proc. Natl. Acad. Sci. U.S.A. 78:1441-1445), the regulatory sequences of the metallothionein gene (Brinster et al, 1982, Nature 296:39-42), etc. Any type of plasmid, cosmid, YAC or viral vector can be used to prepare the recombinant DNA

construct which can be introduced directly into the tissue site; e.g., the choroid plexus or hypothalamus. Alternatively, viral vectors can be used which selectively infect the desired tissue (e.g., for brain, herpesvirus vectors may be used), in which case administration may be accomplished by another route (e.g., systemically).

In another aspect of the invention, ribozyme molecules designed to catalytically cleave target mRNA transcripts can be used to prevent translation of target mRNA and expression of a target protein (See, e.g., PCT International Publication WO90/11364, published October 4, 1990; Sarver *et al.*, 1990, Science 247:1222-1225 and U.S. Patent No. 5,093,246). While ribozymes that cleave mRNA at site specific recognition sequences can be used to destroy target mRNAs, the use of hammerhead ribozymes is preferred. Hammerhead ribozymes cleave mRNAs at locations dictated by flanking regions that form complementary base pairs with the target mRNA. The sole requirement is that the target mRNA have the following sequence of two bases: 5'-UG-3'. The construction and production of hammerhead ribozymes is well known in the art and is described more fully in Haseloff and Gerlach, 1988, Nature, 334:585-591. Preferably the ribozyme is engineered so that the cleavage recognition site is located near the 5' end of the target mRNA; i.e., to increase efficiency and minimize the intracellular accumulation of non-functional mRNA transcripts.

The ribozymes of the present invention also include RNA endoribonucleases (hereinafter "Cech-type ribozymes") such as the one which occurs naturally in *Tetrahymena thermophila* (known as the IVS, or L-19 IVS RNA) and which has been extensively described by Thomas Cech and collaborators (Zaug, et al., 1984, Science, 224:574-578; Zaug and Cech, 1986, Science, 231:470-475; Zaug, et al., 1986, Nature, 324:429-433; published International patent application No. WO88/04300 by University Patents Inc.; Been and Cech, 1986, Cell, 47:207-216). The Cech-type ribozymes have an eight base pair active site which hybridizes to a target RNA sequence whereafter cleavage of the target RNA takes place. The invention encompasses those Cech-type ribozymes which target eight base-pair active site sequences that are present in a target gene.

As in the antisense approach, the ribozymes can be composed of modified oligonucleotides (e.g., for improved stability, targeting, etc.) and should be delivered to cells which express the target gene *in vivo*. A preferred method of delivery

involves using a DNA construct "encoding" the ribozyme under the control of a strong constitutive pol III or pol II promoter, so that transfected cells will produce sufficient quantities of the ribozyme to destroy endogenous messages and inhibit translation. Because ribozymes, unlike antisense molecules, are catalytic, a lower intracellular concentration is required for efficiency.

Antisense RNA, DNA, and ribozyme molecules of the invention may be prepared by any method known in the art for the synthesis of DNA and RNA molecules. These include techniques for chemically synthesizing oligodeoxyribonucleotides and oligoribonucleotides well known in the art such as for example solid phase phosphoramidite chemical synthesis. Alternatively, RNA molecules may be generated by *in vitro* and *in vivo* transcription of DNA sequences encoding the antisense RNA molecule. Such DNA sequences may be incorporated into a wide variety of vectors which incorporate suitable RNA polymerase promoters such as the T7 or SP6 polymerase promoters. Alternatively, antisense cDNA constructs that synthesize antisense RNA constitutively or inducibly, depending on the promoter used, can be introduced stably into cell lines.

Moreover, various well-known modifications to nucleic acid molecules may be introduced as a means of increasing intracellular stability and half-life. Possible modifications include but are not limited to the addition of flanking sequences of ribonucleotides or deoxyribonucleotides to the 5' and/or 3' ends of the molecule or the use of phosphorothioate or 2' O-methyl rather than phosphodiesterase linkages within the oligodeoxyribonucleotide backbone.

VIII. Polypeptides of the Present Invention

The present invention makes available isolated polypeptides which are isolated from, or otherwise substantially free of other cellular proteins, especially other signal transduction factors and/or transcription factors which may normally be associated with the polypeptide. Subject polypeptides of the present invention include polypeptides encoded by the nucleic acids of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, or polypeptides encoded by genes of which a sequence in SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, is a fragment. Polypeptides of the present invention

include those proteins which are differentially regulated in tumor cells, especially colon cancer-derived cell lines (relative to normal cells, e.g., normal colon tissue and non-colon tissue). In preferred embodiments, the polypeptides are upregulated in tumor cells, especially colon cancer cancer-derived cell lines. In other embodiments, the polypeptides are downregulated in tumor cells, especially colon cancer-derived cell lines. Proteins which are upregulated, such as oncogenes, or downregulated, such as tumor suppressors, in aberrantly proliferating cells may be targets for diagnostic or therapeutic techniques. For example, upregulation of the *cdc2* gene induces mitosis. Overexpression of the *myt1* gene, a mitotic deactivator, negatively regulates the activity of *cdc2*. Aberrant proliferation may thus be induced either by upregulating *cdc2* or by downregulating *myt1*.

The term "substantially free of other cellular proteins" (also referred to herein as "contaminating proteins") or "substantially pure or purified preparations" are defined as encompassing preparations of polypeptides having less than about 20% (by dry weight) contaminating protein, and preferably having less than about 5% contaminating protein. Functional forms of the subject polypeptides can be prepared, for the first time, as purified preparations by using a cloned nucleic acid as described herein. Full length proteins or fragments corresponding to one or more particular motifs and/or domains or to arbitrary sizes, for example, at least about 5, 10, 25, 50, 75, or 100 amino acids in length are within the scope of the present invention.

For example, isolated polypeptides can be encoded by all or a portion of a nucleic acid sequence shown in any of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto. Isolated peptidyl portions of proteins can be obtained by screening peptides recombinantly produced from the corresponding fragment of the nucleic acid encoding such peptides. In addition, fragments can be chemically synthesized using techniques known in the art such as conventional Merrifield solid phase f-Moc or t-Boc chemistry. For example, a polypeptide of the present invention may be arbitrarily divided into fragments of desired length with no overlap of the fragments, or preferably divided into overlapping fragments of a desired length. The fragments can be produced (recombinantly or by chemical synthesis) and tested to identify those peptidyl fragments which can function as either agonists or antagonists of a wild-type (e.g., "authentic") protein.

Another aspect of the present invention concerns recombinant forms of the subject proteins. Recombinant polypeptides preferred by the present invention, in addition to native proteins, as described above are encoded by a nucleic acid, which is at least 60%, more preferably at least 80%, and more preferably 85%, and more preferably 90%, and more preferably 95% identical to an amino acid sequence encoded by SEQ ID Nos. 1-544. Polypeptides which are encoded by a nucleic acid that is at least about 98-99% identical with the sequence of SEQ ID Nos. 1-544 are also within the scope of the invention. Also included in the present invention are peptide fragments comprising at least a portion of such a protein.

In a preferred embodiment, a polypeptide of the present invention is a mammalian polypeptide and even more preferably a human polypeptide. In particularly preferred embodiment, the polypeptide retains wild-type bioactivity. It will be understood that certain post-translational modifications, e.g., phosphorylation and the like, can increase the apparent molecular weight of the polypeptide relative to the unmodified polypeptide chain.

The present invention further pertains to recombinant forms of one of the subject polypeptides. Such recombinant polypeptides preferably are capable of functioning in one of either role of an agonist or antagonist of at least one biological activity of a wild-type ("authentic") polypeptide of the appended sequence listing. The term "evolutionarily related to", with respect to amino acid sequences of proteins, refers to both polypeptides having amino acid sequences which have arisen naturally, and also to mutational variants of human polypeptides which are derived, for example, by combinatorial mutagenesis.

In general, polypeptides referred to herein as having an activity (e.g., are "bioactive") of a protein are defined as polypeptides which include an amino acid sequence encoded by all or a portion of the nucleic acid sequences shown in one of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, and which mimic or antagonize all or a portion of the biological/biochemical activities of a naturally occurring protein. According to the present invention, a polypeptide has biological activity if it is a specific agonist or antagonist of a naturally occurring form of a protein.

Assays for determining whether a compound, e.g, a protein or variant thereof, has one or more of the above biological activities are well known in the art. In certain

embodiments, the polypeptides of the present invention have activities such as those outlined above.

In another embodiment, the coding sequences for the polypeptide can be incorporated as a part of a fusion gene including a nucleotide sequence encoding a different polypeptide. This type of expression system can be useful under conditions where it is desirable to produce an immunogenic fragment of a polypeptide (see, for example, EP Publication No: 0259149; and Evans *et al.* (1989) Nature 339:385; Huang *et al.* (1988) J. Virol. 62:3855; and Schlienger *et al.* (1992) J. Virol. 66:2). In addition to utilizing fusion proteins to enhance immunogenicity, it is widely appreciated that fusion proteins can also facilitate the expression of proteins, and, accordingly, can be used in the expression of the polypeptides of the present invention (see, for example, Current Protocols in Molecular Biology, eds. Ausubel et al. (N.Y.: John Wiley & Sons, 1991)). In another embodiment, a fusion gene coding for a purification leader sequence, such as a poly-(His)/enterokinase cleavage site sequence at the N-terminus of the desired portion of the recombinant protein, can allow purification of the expressed fusion protein by affinity chromatography using a Ni^{2+} metal resin. The purification leader sequence can then be subsequently removed by treatment with enterokinase to provide the purified protein (e.g., see Hochuli *et al.* (1987) J. Chromatography 411:177; and Janknecht *et al.* PNAS 88:8972).

Techniques for making fusion genes are known to those skilled in the art. Essentially, the joining of various DNA fragments coding for different polypeptide sequences is performed in accordance with conventional techniques, employing blunt-ended or stagger-ended termini for ligation, restriction enzyme digestion to provide for appropriate termini, filling-in of cohesive ends as appropriate, alkaline phosphatase treatment to avoid undesirable joining, and enzymatic ligation. In another embodiment, the fusion gene can be synthesized by conventional techniques including automated DNA synthesizers. Alternatively, PCR amplification of nucleic acid fragments can be carried out using anchor primers which give rise to complementary overhangs between two consecutive nucleic acid fragments which can subsequently be annealed to generate a chimeric nucleic acid sequence (see, for example, Current Protocols in Molecular Biology, eds. Ausubel et al. John Wiley & Sons: 1992).

The present invention further pertains to methods of producing the subject polypeptides. For example, a host cell transfected with a nucleic acid vector directing

expression of a nucleotide sequence encoding the subject polypeptides can be cultured under appropriate conditions to allow expression of the peptide to occur. Suitable media for cell culture are well known in the art. The recombinant polypeptide can be isolated from cell culture medium, host cells, or both using techniques known in the art for purifying proteins including ion-exchange chromatography, gel filtration chromatography, ultrafiltration, electrophoresis, and immunoaffinity purification with antibodies specific for such peptide. In a preferred embodiment, the recombinant polypeptide is a fusion protein containing a domain which facilitates its purification, such as GST fusion protein.

Moreover, it will be generally appreciated that, under certain circumstances, it may be advantageous to provide homologs of one of the subject polypeptides which function in a limited capacity as one of either an agonist (mimetic) or an antagonist, in order to promote or inhibit only a subset of the biological activities of the naturally occurring form of the protein. Thus, specific biological effects can be elicited by treatment with a homolog of limited function, and with fewer side effects relative to treatment with agonists or antagonists which are directed to all of the biological activities of naturally occurring forms of subject proteins.

Homologs of each of the subject polypeptide can be generated by mutagenesis, such as by discrete point mutation(s), or by truncation. For instance, mutation can give rise to homologs which retain substantially the same, or merely a subset, of the biological activity of the polypeptide from which it was derived. Alternatively, antagonistic forms of the polypeptide can be generated which are able to inhibit the function of the naturally occurring form of the protein, such as by competitively binding to a receptor.

The recombinant polypeptides of the present invention also include homologs of the wild-type proteins, such as versions of those proteins which are resistant to proteolytic cleavage, for example, due to mutations which alter ubiquitination or other enzymatic targeting associated with the protein.

Polypeptides may also be chemically modified to create derivatives by forming covalent or aggregate conjugates with other chemical moieties, such as glycosyl groups, lipids, phosphate, acetyl groups and the like. Covalent derivatives of proteins can be prepared by linking the chemical moieties to functional groups on

amino acid sidechains of the protein or at the N-terminus or at the C-terminus of the polypeptide.

Modification of the structure of the subject polypeptides can be for such purposes as enhancing therapeutic or prophylactic efficacy, stability (e.g., *ex vivo* shelf life and resistance to proteolytic degradation), or post-translational modifications (e.g., to alter phosphorylation pattern of protein). Such modified peptides, when designed to retain at least one activity of the naturally occurring form of the protein, or to produce specific antagonists thereof, are considered functional equivalents of the polypeptides described in more detail herein. Such modified peptides can be produced, for instance, by amino acid substitution, deletion, or addition. The substitutional variant may be a substituted conserved amino acid or a substituted non-conserved amino acid.

For example, it is reasonable to expect that an isolated replacement of a leucine with an isoleucine or valine, an aspartate with a glutamate, a threonine with a serine, or a similar replacement of an amino acid with a structurally related amino acid (i.e., isosteric and/or isoelectric mutations) will not have a major effect on the biological activity of the resulting molecule. Conservative replacements are those that take place within a family of amino acids that are related in their side chains. Genetically encoded amino acids can be divided into four families: (1) acidic = aspartate, glutamate; (2) basic = lysine, arginine, histidine; (3) nonpolar = alanine, valine, leucine, isoleucine, proline, phenylalanine, methionine, tryptophan; and (4) uncharged polar = glycine, asparagine, glutamine, cysteine, serine, threonine, tyrosine. In similar fashion, the amino acid repertoire can be grouped as (1) acidic = aspartate, glutamate; (2) basic = lysine, arginine histidine, (3) aliphatic = glycine, alanine, valine, leucine, isoleucine, serine, threonine, with serine and threonine optionally be grouped separately as aliphatic-hydroxyl; (4) aromatic = phenylalanine, tyrosine, tryptophan; (5) amide = asparagine, glutamine; and (6) sulfur -containing = cysteine and methionine. (see, for example, Biochemistry, 2nd ed., Ed. by L. Stryer, WH Freeman and Co.: 1981). Whether a change in the amino acid sequence of a peptide results in a functional homolog (e.g., functional in the sense that the resulting polypeptide mimics or antagonizes the wild-type form) can be readily determined by assessing the ability of the variant peptide to produce a response in cells in a fashion similar to the wild-type protein, or competitively inhibit such a response.

Polypeptides in which more than one replacement has taken place can readily be tested in the same manner. The variant may be designed so as to retain biological activity of a particular region of the protein. In a non-limiting example, Osawa et al., 1994, Biochemistry and Molecular International 34:1003-1009, discusses the actin binding region of a protein from several different species. The actin binding regions of the these species are considered homologous based on the fact that they have amino acids that fall within "homologous residue groups." Homologous residues are judged according to the following groups (using single letter amino acid designations): STAG; ILVMF; HRK; DEQN; and FYW. For example, an S, a T, an A or a G can be in a position and the function (in this case actin binding) is retained.

Additional guidance on amino acid substitution is available from studies of protein evolution. Go et al., 1980, Int. J. Peptide Protein Res. 15:211-224, classified amino acid residue sites as interior or exterior depending on their accessibility. More frequent substitution on exterior sites was confirmed to be general in eight sets of homologous protein families regardless of their biological functions and the presence or absence of a prosthetic group. Virtually all types of amino acid residues had higher mutabilities on the exterior than in the interior. No correlation between mutability and polarity was observed of amino acid residues in the interior and exterior, respectively. Amino acid residues were classified into one of three groups depending on their polarity: polar (Arg, Lys, His, Gln, Asn, Asp, and Glu); weak polar (Ala, Pro, Gly, Thr, and Ser), and nonpolar (Cys, Val, Met, Ile, Leu, Phe, Tyr, and Trp). Amino acid replacements during protein evolution were very conservative: 88% and 76% of them in the interior or exterior, respectively, were within the same group of the three. Inter-group replacements are such that weak polar residues are replaced more often by nonpolar residues in the interior and more often by polar residues on the exterior.

Querol et al., 1996, Prot. Eng. 9:265-271, provides general rules for amino acid substitutions to enhance protein thermostability. New glycosylation sites can be introduced as discussed in Olsen and Thomsen, 1991, J. Gen. Microbiol. 137:579-585. An additional disulfide bridge can be introduced, as discussed by Perry and Wetzel, 1984, Science 226:555-557; Pantoliano et al., 1987, Biochemistry 26:2077-2082; Matsumura et al., 1989, Nature 342:291-293; Nishikawa et al., 1990, Protein Eng. 3:443-448; Takagi et al., 1990, J. Biol. Chem. 265:6874-6878; Clarke et al., 1993, Biochemistry 32:4322-4329; and Wakarchuk et al., 1994, Protein Eng. 7:1379-1386.

An additional metal binding site can be introduced, according to Toma et al., 1991, Biochemistry 30:97-106, and Haezerbrouck et al., 1993, Protein Eng. 6:643-649. Substitutions with prolines in loops can be made according to Masul et al., 1994, Appl. Env. Microbiol. 60:3579-3584; and Hardy et al., FEBS Lett. 317:89-92.

Cysteine-depleted muteins are considered variants within the scope of the invention. These variants can be constructed according to methods disclosed in U.S. Patent No. 4,959,314, which discloses how to substitute other amino acids for cysteines, and how to determine biological activity and effect of the substitution. Such methods are suitable for proteins according to this invention that have cysteine residues suitable for such substitutions, for example to eliminate disulfide bond formation.

To learn the identity and function of the gene that correlates with an nucleic acid, the nucleic acids or corresponding amino acid sequences can be screened against profiles of protein families. Such profiles focus on common structural motifs among proteins of each family. Publicly available profiles are described above. Additional or alternative profiles are described below.

In comparing a new nucleic acid with known sequences, several alignment tools are available. Examples include PileUp, which creates a multiple sequence alignment, and is described in Feng *et al.*, *J. Mol. Evol.* (1987) *25*:351-360. Another method, GAP, uses the alignment method of Needleman *et al.*, *J. Mol. Biol.* (1970) *48*:443-453. GAP is best suited for global alignment of sequences. A third method, BestFit, functions by inserting gaps to maximize the number of matches using the local homology algorithm of Smith and Waterman, *Adv. Appl. Math.* (1981) *2*:482-489.

Examples of such profiles are described below.

Chemokines

Chemokines are a family of proteins that have been implicated in lymphocyte trafficking, inflammatory diseases, angiogenesis, hematopoiesis, and viral infection. See, for example, Rollins, *Blood* (1997) *90(3)*:909-928, and Wells *et al.*, *J. Leuk. Biol.* (1997) *61*:545-550. U.S. Patent No. 5,605,817 discloses DNA encoding a chemokine expressed in fetal spleen. U.S. Patent No. 5,656,724 discloses chemokine-like

proteins and methods of use. U.S. Patent No. 5,602,008 discloses DNA encoding a chemokine expressed by liver.

Mutants of the encoded chemokines are polypeptides having an amino acid sequence that possesses at least one amino acid substitution, addition, or deletion as compared to native chemokines. Fragments possess the same amino acid sequence of the native chemokines; mutants may lack the amino and/or carboxyl terminal sequences. Fusions are mutants, fragments, or the native chemokines that also include amino and/or carboxyl terminal amino acid extensions.

The number or type of the amino acid changes is not critical, nor is the length or number of the amino acid deletions, or amino acid extensions that are incorporated in the chemokines as compared to the native chemokine amino acid sequences. A polynucleotide encoding one of these variant polypeptides will retain at least about 80% amino acid identity with at least one known chemokine. Preferably, these polypeptides will retain at least about 85% amino acid sequence identity, more preferably, at least about 90%; even more preferably, at least about 95%. In addition, the variants will exhibit at least 80%; preferably about 90%; more preferably about 95% of at least one activity exhibited by a native chemokine. Chemokine activity includes immunological, biological, receptor binding, and signal transduction functions of the native chemokine.

Chemotaxis. Assays for chemotaxis relating to neutrophils are described in Walz *et al.*, *Biochem. Biophys. Res. Commun.* (1987) *149*:755, Yoshimura *et al.*, *Proc. Natl. Acad. Sci. (USA)* (1987) *84*:9233, and Schroder *et al.*, *J. Immunol.* (1987) *139*:3474; to lymphocytes, Larsen *et al.*, *Science* (1989) *243*:1464, Carr *et al.*, *Proc. Natl. Acad. Sci. (USA)* (1994) *91*:3652; to tumor-infiltrating lymphocytes, Liao *et al.*, *J. Exp. Med* (1995). *182*:1301; to hemopoietic progenitors, Aiuti *et al.*, *J. Exp. Med.* (1997) *185*:111; to monocytes, Valente *et al.*, *Biochem.* (1988) *27*:4162; and to natural killer cells, Loetscher *et al.*, *J. Immunol.* (1996) *156*:322, and Allavena *et al.*, *Eur. J. Immunol.* (1994) *24*:3233.

Assays for determining the biological activity of attracting eosinophils are described in Dahinden *et al.*, *J. Exp. Med.* (1994) *179*:751, Weber *et al.*, *J. Immunol.* (1995) *154*:4166, and Noso *et al.*, *Biochem. Biophys. Res. Commun.* (1994) *200*:1470; for attracting dendritic cells, Sozzani *et al.*, *J. Immunol.* (1995) *155*:3292; for attracting basophils, in Dahinden *et al.*, *J. Exp. Med.* (1994) *179*:751, Alam *et al.*, *J.*

Immunol. (1994) *152*:1298, Alam *et al., J. Exp. Med.* (1992) *176*:781; and for activating neutrophils, Maghazaci *et al., Eur. J. Immunol.* (1996) *26*:315, and Taub *et al., J. Immunol.* (1995) *155*:3877. Native chemokines can act as mitogens for fibroblasts, assayed as described in Mullenbach *et al., J. Biol. Chem.* (1986) *261*:719.

Receptor Binding. Native chemokines exhibit binding activity with a number of receptors. Description of such receptors and assays to detect binding are described in, for example, Murphy *et al., Science* (1991) *253*:1280; Combadiere *et al., J. Biol. Chem.* (1995) *270*:29671; Daugherty *et al., J. Exp. Med.* (1996) *183*:2349; Samson *et al., Biochem.* (1996) *35*:3362; Raport *et al., J. Biol. Chem.* (1996) *271*:17161; Combadiere *et al., J. Leukoc. Biol.* (1996) *60*:147; Baba *et al., J. Biol. Chem.* (1997) *23*:14893; Yosida *et al., J. Biol. Chem.* (1997) *272*:13803; Arvannitakis *et al., Nature* (1997) *385*:347, and many other assays are known in the art.

Kinase Activiation. Assays for kinase activation are described by Yen *et al., J. Leukoc. Biol.* (1997) *61*:529; Dubois *et al., J. Immunol.* (1996) *156*:1356; Turner *et al., J. Immunol.* (1995) *155*:2437. Assays for inhibition of angiogenesis or cell proliferation are described in Maione *et al., Science* (1990) *247*:77. Glycosaminoglycan production can be induced by native chemokines, assayed as described in Castor *et al., Proc. Natl. Acad. Sci. (USA)* (1983) *80*:765. Chemokine-mediated histamine release from basophils is assayed as described in Dahinden *et al., J. Exp. Med.* (1989) *170*:1787; and White *et al., Immunol. Lett.* (1989) *22*:151. Heparin binding is described in Luster *et al., J. Exp. Med.* (1995) *182*:219.

Dimerization Activity. Chemokines can possess dimerization activity, which can be assayed according to Burrows *et al., Biochem.* (1994) *33*:12741; and Zhang *et al., Mol. Cell. Biol.* (1995) *15*:4851. Native chemokines can play a role in the inflammatory response of viruses. This activity can be assayed as described in Bleul *et al., Nature* (1996) *382*:829; and Oberlin *et al., Nature* (1996) *382*:833. Exocytosis of monocytes can be promoted by native chemokines. The assay for such activity is described in Uguccioni *et al., Eur. J. Immunol.* (1995) *25*:64. Native chemokines also can inhibit hemapoietic stem cell proliferation. The method for testing for such activity is reported in Graham *et al., Nature* (1990) *344*:442.

Death Domain Proteins Several protein families contain death domain motifs (Feinstein and Kimchi, *TIBS Letters* (1995) *20*:242-244). Some death domain-containing proteins are implicated in cytotoxic intracellular signaling (Cleveland and

Ihle, *Cell* (1995) *81*:479-482, Pan *et al*, *Science* (1997) *276*:111-113, Duan and Dixit, *Nature* (1997) *385*:86-89, and Chinnaiyan *et al*, *Science* (1996) *274*:990-992). U.S. Patent No. 5,563,039 describes a protein homologous to TRADD (Tumor Necrosis Factor Receptor-1 Associated Death Domain containing protein), and modifications of the active domain of TRADD that retain the functional characteristics of the protein, as well as apoptosis assays for testing the function of such death domain containing proteins. U.S. Patent No. 5,658,883 discloses biologically active TGF-B1 peptides. U.S. Patent No. 5,674,734 discloses protein RIP which contains a C-terminal death domain and an N-terminal kinase domain.

Leukemia Inhibitory Factor (LIF) An LIF profile is constructed from sequences of leukemia inhibitor factor, CT-1 (cardiotrophin-1), CNTF (ciliary neurotrophic factor), OSM (oncostatin M), and IL-6 (interleukin-6). This profile encompasses a family of secreted cytokines that have pleiotropic effects on many cell types including hepatocytes, osteoclasts, neuronal cells and cardiac myocytes, and can be used to detect additional genes encoding such proteins. These molecules are all structurally related and share a common co-receptor gp130 which mediates intracellular signal transduction by cytoplasmic tyrosine kinases such as src.

Novel proteins related to this family are also likely to be secreted, to activate gp130 and to function in the development of a variety of cell types. Thus new members of this family would be candidates to be developed as growth or survival factors for the cell types that they stimulate. For more details on this family of cytokines, see Pennica *et al*, *Cytokine and Growth Factor Reviews* (1996) *7*:81-91. U.S. Patent No. 5,420,247 discloses LIF receptor and fusion proteins. U.S. Patent No. 5,443,825 discloses human LIF.

Angiopoietin Angiopoietin-1 is a secreted ligand of the TIE-2 tyrosine kinase; it functions as an angiogenic factor critical for normal vascular development. Angiopoietin-2 is a natural antagonist of angiopoietin-1 and thus functions as an anti-angiogenic factor. These two proteins are structurally similar and activate the same receptor. (Folkman and D'Amore, *Cell* (1996) *87*:1153-1155, and Davis *et al.*, *Cell* (1996) *87*:1161-1169.)

The angiopoietin molecules are composed of two domains, a coiled-coil region and a region related to fibrinogen. The fibrinogen domain is found in many molecules including ficolin and tesascin, and is well defined structurally with many members.

Receptor Protein-Tyrosine Kinases Receptor Protein-Tyrosine Kinases or RPTKs are described in Lindberg, *Annu. Rev. Cell Biol.* (1994) *10*:251-337.

Growth Factors: Epidermal Growth Factor (EGF) and Fibroblast Growth Factor (FGF)

For a discussion of growth factor superfamilies, see Growth Factors: A Practical Approach, Appendix A1 (Ed. McKay and Leigh, Oxford University Press, NY, 1993) pp. 237-243.

The alignments (pretty box) for EGF and FGF are shown in Figures 1 and 2, respectively. U.S. Patent No. 4,444,760 discloses acidic brain fibroblast growth factor, which is active in the promotion of cell division and wound healing. U.S. Patent No. 5,439,818 discloses DNA encoding human recombinant basic fibroblast growth factor, which is active in wound healing. U.S. Patent No. 5,604,293 discloses recombinant human basic fibroblast growth factor, which is useful for wound healing. U.S. Patent No. 5,410,832 discloses brain-derived and recombinant acidic fibroblast growth factor, which act as mitogens for mesoderm and neuroectoderm-derived cells in culture, and promote wound healing in soft tissue, cartilaginous tissue and musculo-skeletal tissue. U.S. Patent No. 5,387,673 discloses biologically active fragments of FGF that retain activity.

Proteins of the TNF Family A profile derived from the TNF family is created by aligning sequences of the following TNF family members: nerve growth factor (NGF), lymphotoxin, Fas ligand, tumor necrosis factor (TNF), CD40 ligand, TRAIL, ox40 ligand, 4-1BB ligand, CD27 ligand, and CD30 ligand. The profile is designed to identify sequences of proteins that constitute new members or homologues of this family of proteins.

U.S. Patent No. 5,606,023 discloses mutant TNF proteins; U.S. Patent No. 5,597,899 and U.S. Patent No. 5,486,463 disclose TNF muteins; and U.S. Patent No. 5,652,353 discloses DNA encoding TNF-α muteins.

Members of the TNF family of proteins have been show in vitro to multimerize, as described in Burrows *et al.*, *Biochem.* (1994) *33*:12741 and Zhang *et al.*, *Mol. Cell. Biol.* (1995) 154851 and bind receptors as described in Browning *et al.*, *J. Immunol.* (1994) *147*:1230, Androlewicz *et al.*, *J. Biol. Chem.*(1992) *267*:2542, and Crowe *et al.*, *Science* (1994) *264*:707.

In vivo, TNFs proteolytically cleave a target protein as described in Kriegel *et al., Cell* (1988) *53*:45 and Mohler *et al., Nature* (1994) *370*:218 and demonstrate cell proliferation and differentiation activity. T-cell or thymocyte proliferation is assayed as described in Armitage *et al., Eur. J. Immunol.* (1992) *22*:447; Current Protocols in Immunology, ed. J.E. Coligan *et al.*, 3.1-3.19; Takai *et al., J. Immunol.* (1986) *137*:3494-3500, Bertagnoli *et al., J. Immunol.* (1990) *145*:1706-1712, Bertagnoli *et al., J. Immunol.* (1991) *133*:327-340, Bertagnoli *et al., J. Immunol.* (1992) *149*:3778-3783, and Bowman *et al., J. Immunol.* (1994) *152*:1756-1761. B cell proliferation and Ig secretion are assayed as described in Maliszewski, *J. Immunol.* (1990) *144*:3028-3033, and Assays for B Cell Function: In vitro antibody production, Mond and Brunswick, Current Protocols in Immunol., Coligan Ed vol 1 pp 3.8.1-3.8.16, John Wiley and Sons, Toronto 1994, Kehrl *et al., Science* (1987) *238*:1144 and Boussiotis *et al., PNAS USA* (1994) *91*:7007.

Other in vivo activities include upregulation of cell surface antigens, upregulation of costimulatory molecules, and cellular aggregation/adhesion as described in Barrett *et al., J. Immunol.* (1991) *146*:1722; Bjorck *et al., Eur. J. Immunol.* (1993) *23*:1771; Clark *et al., Annu Rev. Immunol.* (1991) *9*:97; Ranheim *et al., J. Exp. Med.* (1994) *177*:925; Yellin, *J. Immunol.* (1994) *153*:666; and Gruss *et al., Blood* (1994) *84*:2305.

Proliferation and differentiation of hematopoietic and lymphopoietic cells has also been shown in vivo for TNFs, using assays for embryonic differentiation and hematopoiesis as described in Johansson *et al., Cellular Biology* (1995) *15*:141-151, Keller *et al., Mol. Cell. Biol.* (1993) *13*:473-486, McClanahan *et al., Blood* (1993) *81*:2903-2915 and using assays to detect stem cell survival and differentiation as described in Culture of Hematopoietic Cells, Freshney *et al.* eds, pp 1-21, 23-29, 139-162, 163-179, and 265-268, Wiley-Liss, Inc., New York, NY, 1994, and Hirajama *et al., PNAS USA* (1992) *89*:5907-5911.

In vivo activities of TNFs also include lymphocyte survival and apoptosis, assayed as described in Darzynkewicz *et al., Cytometry* (1992) *13*:795-808; Gorczca *et al., Leukemia* (1993) *7*:659-670; Itoh *et al., Cell* (1991) *66*:233-243; Zacharduk, *J. Immunol.* (1990) *145*:4037-4045; Zamai *et al., Cytometry* (1993) *14*:891-897; and Gorczyca *et al., Int'l J. Oncol.* (1992) *1*:639-648.

Some members of the TNF family are cleaved from the cell surface; others remain membrane bound. The three-dimensional structure of TNF is discussed in Sprang and Eck, Tumor Necrosis Factors; *supra*.

TNF proteins include a transmembrane domain. The protein is cleaved into a shorter soluble version, as described in Kriegler *et al.*, *Cell* (1988) *53*:45-53, Perez *et al.*, *Cell* (1990) *63*:251-258, and Shaw *et al.*, *Cell* (1986) *46*:659-667. The transmembrane domain is between amino acid 46 and 77 and the cytoplasmic domain is between position 1 and 45 on the human form of TNFα(. The 3-dimensional motifs of TNF include a sandwich of two pleated β-sheets. Each sheet is composed of anti-parallel α-strands. α-Strands facing each other on opposite sites of the sandwich are connected by short polypeptide loops, as described in Van Ostade *et al.*, *Protein Engineering* (1994) *7(1)*:5-22, and Sprang *et al.*, Tumor Necrosis Factors; *supra*.

Residues of the TNF family proteins that are involved in the β-sheet secondary structure have been identified as described in Van Ostade *et al., Protein Engineering* (1994) *7(1)*:5-22, and Sprang *et al.*, Tumor Necrosis Factors; *supra*.

TNF receptors are disclosed in U.S. Patent No. 5,395,760. A profile derived from the TNF receptor family is created by aligning sequences of the TNF receptor family, including Apo1/Fas, TNFR I and II, death receptor3 (DR3), CD40, ox40, CD27, and CD30. Thus, the profile is designed to identify, from the nucleic acids of the invention, sequences of proteins that constitute new members or homologs of this family of proteins.

Tumor necrosis factor receptors exist in two forms in humans: p55 TNFR and p75 TNFR, both of which provide intracellular signals upon binding with a ligand. The extracellular domains of these receptor proteins are cysteine rich. The receptors can remain membrane bound, although some forms of the receptors are cleaved forming soluble receptors. The regulation, diagnostic, prognostic, and therapeutic value of soluble TNF receptors is discussed in Aderka, *Cytokine and Growth Factor Reviews*, (1996) 7(3):231-240.

<u>PDGF Family</u> U.S. Patent No. 5,326,695 discloses platelet derived growth factor agonists; bioactive portions of PDGF-B are used as agonists. U.S. Patent No. 4,845,075 discloses biologically active B-chain homodimers, and also includes variants and derivatives of the PDGF-B chain. U.S. Patent No. 5,128,321 discloses

PDGF analogs and methods of use. Proteins having the same bioactivity as PDGF are disclosed, including A and B chain proteins.

Kinase (Including MKK) Family U.S. Patent No. 5,650,501 discloses serine/threonine kinase, associated with mitotic and meiotic cell division; the protein has a kinase domain in its N-terminal and 3 PEST regions in the C-terminus. U.S. Patent No. 5,605,825 discloses human PAK65, a serine protein kinase.

The foregoing discussion provides a few examples of the protein profiles that can be compared with the nucleic acids of the invention. One skilled in the art can use these and other protein profiles to identify the genes that correlate with the nucleic acids.

IX. Determining the Function of the Encoded Expression Products

Ribozymes, antisense constructs, dominant negative mutants, and triplex formation can be used to determine function of the expression product of an nucleic acid-related gene.

A. Ribozymes

Trans-cleaving catalytic RNAs (ribozymes) are RNA molecules possessing endoribonuclease activity. Ribozymes are specifically designed for a particular target, and the target message must contain a specific nucleotide sequence. They are engineered to cleave any RNA species site-specifically in the background of cellular RNA. The cleavage event renders the mRNA unstable and prevents protein expression. Importantly, ribozymes can be used to inhibit expression of a gene of unknown function for the purpose of determining its function in an in vitro or in vivo context, by detecting the phenotypic effect.

One commonly used ribozyme motif is the hammerhead, for which the substrate sequence requirements are minimal. Design of the hammerhead ribozyme is disclosed in Usman *et al., Current Opin. Struct. Biol.* (1996) *6*:527-533. Usman also discusses the therapeutic uses of ribozymes. Ribozymes can also be prepared and used as described in Long *et al., FASEB J.* (1993) *7*:25; Symons, *Ann. Rev. Biochem.* (1992) *61*:641; Perrotta *et al., Biochem.* (1992) *31*:16-17; Ojwang *et al., Proc. Natl. Acad. Sci. (USA)* (1992) *89*:10802-10806; and U.S. Patent No. 5,254,678. Ribozyme cleavage of HIV-I RNA is described in U.S. Patent No. 5,144,019; methods of cleaving RNA using ribozymes is described in U.S. Patent No.

5,116,742; and methods for increasing the specificity of ribozymes are described in U.S. Patent No. 5,225,337 and Koizumi *et al., Nucleic Acid Res.* (1989) *17*:7059-7071. Preparation and use of ribozyme fragments in a hammerhead structure are also described by Koizumi *et al., Nucleic Acids Res.* (1989) *17*:7059-7071. Preparation and use of ribozyme fragments in a hairpin structure are described by Chowrira and Burke, *Nucleic Acids Res.* (1992) *20*:2835. Ribozymes can also be made by rolling transcription as described in Daubendiek and Kool, *Nat. Biotechnol.* (1997) *15(3)*:273-277.

The hybridizing region of the ribozyme may be modified or may be prepared as a branched structure as described in Horn and Urdea, *Nucleic Acids Res.* (1989) *17*:6959-67. The basic structure of the ribozymes may also be chemically altered in ways familiar to those skilled in the art, and chemically synthesized ribozymes can be administered as synthetic oligonucleotide derivatives modified by monomeric units. In a therapeutic context, liposome mediated delivery of ribozymes improves cellular uptake, as described in Birikh *et al., Eur. J. Biochem.* (1997) *245*:1-16.

Using the nucleic acid sequences of the invention and methods known in the art, ribozymes are designed to specifically bind and cut the corresponding mRNA species. Ribozymes thus provide a means to inhibit the expression of any of the proteins encoded by the disclosed nucleic acids or their full-length genes. The full-length gene need not be known in order to design and use specific inhibitory ribozymes. In the case of a nucleic acid or cDNA of unknown function, ribozymes corresponding to that nucleotide sequence can be tested in vitro for efficacy in cleaving the target transcript. Those ribozymes that effect cleavage in vitro are further tested in vivo. The ribozyme can also be used to generate an animal model for a disease, as described in Birikh *et al., Eur. J. Biochem.* (1997) *245*:1-16. An effective ribozyme is used to determine the function of the gene of interest by blocking its transcription and detecting a change in the cell. Where the gene is found to be a mediator in a disease, an effective ribozyme is designed and delivered in a gene therapy for blocking transcription and expression of the gene.

Therapeutic and functional genomic applications of ribozymes proceed beginning with knowledge of a portion of the coding sequence of the gene to be inhibited. Thus, for many genes, a partial nucleic acid sequence provides adequate sequence for constructing an effective ribozyme. A target cleavage site is selected in

the target sequence, and a ribozyme is constructed based on the 5' and 3' nucleotide sequences that flank the cleavage site. Retroviral vectors are engineered to express monomeric and multimeric hammerhead ribozymes targeting the mRNA of the target coding sequence. These monomeric and multimeric ribozymes are tested in vitro for an ability to cleave the target mRNA. A cell line is stably transduced with the retroviral vectors expressing the ribozymes, and the transduction is confirmed by Northern blot analysis and reverse-transcription polymerase chain reaction (RT-PCR). The cells are screened for inactivation of the target mRNA by such indicators as reduction of expression of disease markers or reduction of the gene product of the target mRNA.

B. Antisense

Antisense nucleic acids are designed to specifically bind to RNA, resulting in the formation of RNA-DNA or RNA-RNA hybrids, with an arrest of DNA replication, reverse transcription or messenger RNA translation. Antisense polynucleotides based on a selected nucleic acid sequence can interfere with expression of the corresponding gene. Antisense polynucleotides are typically generated within the cell by expression from antisense constructs that contain the antisense nucleic acid strand as the transcribed strand. Antisense nucleic acids will bind and/or interfere with the translation of nucleic acid-related mRNA. The expression products of control cells and cells treated with the antisense construct are compared to detect the protein product of the gene corresponding to the nucleic acid. The protein is isolated and identified using routine biochemical methods.

One rationale for using antisense methods to determine the function of the gene corresponding to a nucleic acid is the biological activity of antisense therapeutics. Antisense therapy for a variety of cancers is in clinical phase and has been discussed extensively in the literature. Reed reviewed antisense therapy directed at the Bcl-2 gene in tumors; gene transfer-mediated overexpression of Bcl-2 in tumor cell lines conferred resistance to many types of cancer drugs. (Reed, J.C., *N.C.I.* (1997) *89*:988-990). The potential for clinical development of antisense inhibitors of *ras* is discussed by Cowsert, L.M., *Anti-Cancer Drug Design* (1997) *12*:359-371. Additional important antisense targets include leukemia (Geurtz, A.M., *Anti-Cancer Drug Design* (1997) *12*:341-358); human C-ref kinase (Monia, B.P., *Anti-Cancer*

Drug Design (1997) *12*:327-339); and protein kinase C (McGraw *et al., Anti-Cancer Drug Design* (1997) *12*:315-326.

Given the extensive background literature and clinical experience in antisense therapy, one skilled in the art can use selected nucleic acids of the invention as additional potential therapeutics. The choice of nucleic acid can be narrowed by first testing them for binding to "hot spot" regions of the genome of cancerous cells. If a nucleic acid is identified as binding to a "hot spot", testing the nucleic acid as an antisense compound in the corresponding cancer cells clearly is warranted.

Ogunbiyi *et al., Gastroenterology* (1997) *113(3)*:761-766 describe prognostic use of allelic loss in colon cancer; Barks *et al., Genes, Chromosomes, and Cancer* (1997) *19(4)*:278-285 describe increased chromosome copy number detected by FISH in malignant melanoma; Nishizake *et al., Genes, Chromosomes, and Cancer* (1997) *19(4)*:267-272 describe genetic alterations in primary breast cancer and their metastases and direct comparison using modified comparative genome hybridization; and Elo *et al., Cancer Research* (1997) *57(16)*:3356-3359 disclose that loss of heterozygosity at 16z24.1-q24.2 is significantly associated with metastatic and aggressive behavior of prostate cancer.

C. Dominant Negative Mutations

As an alternative method for identifying function of the nucleic acid-related gene, dominant negative mutations are readily generated for corresponding proteins that are active as homomultimers. A mutant polypeptide will interact with wild-type polypeptides (made from the other allele) and form a non-functional multimer. Thus, a mutation is in a substrate-binding domain, a catalytic domain, or a cellular localization domain. Preferably, the mutant polypeptide will be overproduced. Point mutations are made that have such an effect. In addition, fusion of different polypeptides of various lengths to the terminus of a protein can yield dominant negative mutants. General strategies are available for making dominant negative mutants. See Herskowitz, *Nature* (1987) *329*:219-222. Such a technique can be used for creating a loss-of-function mutation, which is useful for determining the function of a protein.

D. Triplex Formation

Endogenous gene expression can also be reduced by inactivating or "knocking out" the gene or its promoter using targeted homologous recombination. (E.g., see Smithies *et al.*, 1985, Nature 317:230-234; Thomas & Capecchi, 1987, Cell 51:503-512; Thompson et al., 1989 Cell 5:313-321; each of which is incorporated by reference herein in its entirety). For example, a mutant, non-functional gene (or a completely unrelated DNA sequence) flanked by DNA homologous to the endogenous gene (either the coding regions or regulatory regions of the gene) can be used, with or without a selectable marker and/or a negative selectable marker, to transfect cells that express that gene *in vivo*. Insertion of the DNA construct, via targeted homologous recombination, results in inactivation of the gene.

Alternatively, endogenous gene expression can be reduced by targeting deoxyribonucleotide sequences complementary to the regulatory region of the target gene (i.e., the gene promoter and/or enhancers) to form triple helical structures that prevent transcription of the gene in target cells in the body. (See generally, Helene, C. 1991, Anticancer Drug Des., 6(6):569-84; Helene, C., et al., 1992, Ann, N.Y. Accad. Sci., 660:27-36; and Maher, L.J., 1992, Bioassays 14(12):807-15).

Nucleic acid molecules to be used in triple helix formation for the inhibition of transcription are preferably single stranded and composed of deoxyribonucleotides. The base composition of these oligonucleotides should promote triple helix formation via Hoogsteen base-pairing rules, which generally require sizable stretches of either purines or pyrimidines to be present on one strand of a duplex. Nucleotide sequences may be pyrimidine-based, which will result in TAT and CGC triplets across the three associated strands of the resulting triple helix. The pyrimidine-rich molecules provide base complementarity to a purine-rich region of a single strand of the duplex in a parallel orientation to that strand. In addition, nucleic acid molecules may be chosen that are purine-rich, for example, containing a stretch of G residues. These molecules will form a triple helix with a DNA duplex that is rich in GC pairs, in which the majority of the purine residues are located on a single strand of the targeted duplex, resulting in CGC triplets across the three strands in the triplex.

Alternatively, the potential sequences that can be targeted for triple helix formation may be increased by creating a so called "switchback" nucleic acid molecule. Switchback molecules are synthesized in an alternating 5'-3', 3'-5' manner, such that they base pair with first one strand of a duplex and then the other,

eliminating the necessity for a sizable stretch of either purines or pyrimidines to be present on one strand of a duplex.

Antisense RNA and DNA, ribozyme, and triple helix molecules of the invention may be prepared by any method known in the art for the synthesis of DNA and RNA molecules. These include techniques for chemically synthesizing oligodeoxyribonucleotides and oligoribonucleotides well known in the art such as for example solid phase phosphoramidite chemical synthesis. Alternatively, RNA molecules may be generated by *in vitro* and *in vivo* transcription of DNA sequences encoding the antisense RNA molecule. Such DNA sequences may be incorporated into a wide variety of vectors which incorporate suitable RNA polymerase promoters such as the T7 or SP6 polymerase promoters. Alternatively, antisense cDNA constructs that synthesize antisense RNA constitutively or inducibly, depending on the promoter used, can be introduced stably into cell lines.

Moreover, various well known modifications to nucleic acid molecules may be introduced as a means of increasing intracellular stability and half-life. Possible modifications include but are not limited to the addition of flanking sequences of ribonucleotides or deoxyribonucleotides to the 5' and/or 3' ends of the molecule or the use of phosphorothioate or 2' O-methyl rather than phosphodiesterase linkages within the oligodeoxyribonucleotide backbone.

X. Diagnostic & Prognostic Assays and Drug Screening Methods

The present invention provides method for determining whether a subject is at risk for developing a disease or condition characterized by unwanted cell proliferation by detecting the disclosed biomarkers, i.e., the disclosed nucleic acid markers (SEQ ID Nos: 1-544) and/or polypeptide markers for colon cancer encoded thereby.

In clinical applications, human tissue samples can be screened for the presence and/or absence of the biomarkers identified herein. Such samples could consist of needle biopsy cores, surgical resection samples, lymph node tissue, or serum. For example, these methods include obtaining a biopsy, which is optionally fractionated by cryostat sectioning to enrich tumor cells to about 80% of the total cell population. In certain embodiments, nucleic acids extracted from these samples may be amplified using techniques well known in the art. The levels of selected markers detected

would be compared with statistically valid groups of metastatic, non-metastatic malignant, benign, or normal colon tissue samples.

In one embodiment, the diagnostic method comprises determining whether a subject has an abnormal mRNA and/or protein level of the disclosed markers, such as by Northern blot analysis, reverse transcription-polymerase chain reaction (RT-PCR), *in situ* hybridization, immunoprecipitation, Western blot hybridization, or immunohistochemistry. According to the method, cells are obtained from a subject and the levels of the disclosed biomarkers, protein or mRNA level, is determined and compared to the level of these markers in a healthy subject. An abnormal level of the biomarker polypeptide or mRNA levels is likely to be indicative of cancer such as colon cancer.

Accordingly, in one aspect, the invention provides probes and primers that are specific to the unique nucleic acid markers disclosed herein. Accordingly, the nucleic acid probes comprise a nucleotide sequence at least 12 nucleotides in length, preferably at least 15 nucleotides, more preferably, 25 nucleotides, and most preferably at least 40 nucleotides, and up to all or nearly all of the coding sequence which is complementary to a portion of the coding sequence of a marker nucleic acid sequence, which nucleic acid sequence is represented by SEQ ID Nos: 1-544 or a sequence complementary thereto.

In one embodiment, the method comprises using a nucleic acid probe to determine the presence of cancerous cells in a tissue from a patient. Specifically, the method comprises:

1. providing a nucleic acid probe comprising a nucleotide sequence at least 12 nucleotides in length, preferably at least 15 nucleotides, more preferably, 25 nucleotides, and most preferably at least 40 nucleotides, and up to all or nearly all of the coding sequence which is complementary to a portion of the coding sequence of a nucleic acid sequence represented by SEQ ID Nos: 1-544 or a sequence complementary thereto and is differentially expressed in tumors cells, such as colon cancer cells;
2. obtaining a tissue sample from a patient potentially comprising cancerous cells;

3. providing a second tissue sample containing cells substantially all of which are non-cancerous;

4. contacting the nucleic acid probe under stringent conditions with RNA of each of said first and second tissue samples (e.g., in a Northern blot or in situ hybridization assay); and

5. comparing (a) the amount of hybridization of the probe with RNA of the first tissue sample, with (b) the amount of hybridization of the probe with RNA of the second tissue sample; wherein a statistically significant difference in the amount of hybridization with the RNA of the first tissue sample as compared to the amount of hybridization with the RNA of the second tissue sample is indicative of the presence of cancerous cells in the first tissue sample.

In one aspect, the method comprises in situ hybridization with a probe derived from a given marker nucleic acid sequence, which nucleic acid sequence is represented by SEQ ID Nos: 1-544 or a sequence complementary thereto. The method comprises contacting the labeled hybridization probe with a sample of a given type of tissue potentially containing cancerous or pre-cancerous cells as well as normal cells, and determining whether the probe labels some cells of the given tissue type to a degree significantly different (e.g., by at least a factor of two, or at least a factor of five, or at least a factor of twenty, or at least a factor of fifty) than the degree to which it labels other cells of the same tissue type.

Also within the invention is a method of determining the phenotype of a test cell from a given human tissue, e.g., whether the cell is (a) normal, or (b) cancerous or precancerous, by contacting the mRNA of a test cell with a nucleic acid probe at least 12 nucleotides in length, preferably at least 15 nucleotides, more preferably at least 25 nucleotides, and most preferably at least 40 nucleotides, and up to all or nearly all of a sequence which is complementary to a portion of the coding sequence of a nucleic acid sequence represented by SEQ ID Nos: 1-544 or a sequence complementary thereto, and which is differentially expressed in tumor cells as compared to normal cells of the given tissue type; and determining the approximate amount of hybridization of the probe to the mRNA, an amount of hybridization either more or less than that seen with the mRNA of a normal cell of that tissue type being indicative that the test cell is cancerous or pre-cancerous.

Alternatively, the above diagnostic assays may be carried out using antibodies to detect the protein product encoded by the marker nucleic acid sequence, which nucleic acid sequence is represented by SEQ ID Nos: 1-544 or a sequence complementary thereto. Accordingly, in one embodiment, the assay would include contacting the proteins of the test cell with an antibody specific for the gene product of a nucleic acid represented by SEQ ID Nos: 1-544 or a sequence complementary thereto, the marker nucleic acid being one which is expressed at a given control level in normal cells of the same tissue type as the test cell, and determining the approximate amount of immunocomplex formation by the antibody and the proteins of the test cell, wherein a statistically significant difference in the amount of the immunocomplex formed with the proteins of a test cell as compared to a normal cell of the same tissue type is an indication that the test cell is cancerous or pre-cancerous.

Another such method includes the steps of: providing an antibody specific for the gene product of a marker nucleic acid sequence represented by SEQ ID Nos 1-544, the gene product being present in cancerous tissue of a given tissue type (e.g., colon tissue) at a level more or less than the level of the gene product in non-cancerous tissue of the same tissue type; obtaining from a patient a first sample of tissue of the given tissue type, which sample potentially includes cancerous cells; providing a second sample of tissue of the same tissue type (which may be from the same patient or from a normal control, e.g. another individual or cultured cells), this second sample containing normal cells and essentially no cancerous cells; contacting the antibody with protein (which may be partially purified, in lysed but unfractionated cells, or in situ) of the first and second samples under conditions permitting immunocomplex formation between the antibody and the marker nucleic acid sequence product present in the samples; and comparing (a) the amount of immunocomplex formation in the first sample, with (b) the amount of immunocomplex formation in the second sample, wherein a statistically significant difference in the amount of immunocomplex formation in the first sample less as compared to the amount of immunocomplex formation in the second sample is indicative of the presence of cancerous cells in the first sample of tissue.

The subject invention further provides a method of determining whether a cell sample obtained from a subject possesses an abnormal amount of marker polypeptide which comprises (a) obtaining a cell sample from the subject, (b) quantitatively

determining the amount of the marker polypeptide in the sample so obtained, and (c) comparing the amount of the marker polypeptide so determined with a known standard, so as to thereby determine whether the cell sample obtained from the subject possesses an abnormal amount of the marker polypeptide. Such marker polypeptides may be detected by immunohistochemical assays, dot-blot assays, ELISA and the like.

Immunoassays are commonly used to quantitate the levels of proteins in cell samples, and many other immunoassay techniques are known in the art. The invention is not limited to a particular assay procedure, and therefore is intended to include both homogeneous and heterogeneous procedures. Exemplary immunoassays which can be conducted according to the invention include fluorescence polarization immunoassay (FPIA), fluorescence immunoassay (FIA), enzyme immunoassay (EIA), nephelometric inhibition immunoassay (NIA), enzyme linked immunosorbent assay (ELISA), and radioimmunoassay (RIA). An indicator moiety, or label group, can be attached to the subject antibodies and is selected so as to meet the needs of various uses of the method which are often dictated by the availability of assay equipment and compatible immunoassay procedures. General techniques to be used in performing the various immunoassays noted above are known to those of ordinary skill in the art.

In another embodiment, the level of the encoded product, i.e., the product encoded by SEQ ID Nos 1-544 or a sequence complementary thereto, in a biological fluid (e.g., blood or urine) of a patient may be determined as a way of monitoring the level of expression of the marker nucleic acid sequence in cells of that patient. Such a method would include the steps of obtaining a sample of a biological fluid from the patient, contacting the sample (or proteins from the sample) with an antibody specific for a encoded marker polypeptide, and determining the amount of immune complex formation by the antibody, with the amount of immune complex formation being indicative of the level of the marker encoded product in the sample. This determination is particularly instructive when compared to the amount of immune complex formation by the same antibody in a control sample taken from a normal individual or in one or more samples previously or subsequently obtained from the same person.

In another embodiment, the method can be used to determine the amount of marker polypeptide present in a cell, which in turn can be correlated with progression

of a hyperproliferative disorder, e.g., colon cancer. The level of the marker polypeptide can be used predictively to evaluate whether a sample of cells contains cells which are, or are predisposed towards becoming, transformed cells. Moreover, the subject method can be used to assess the phenotype of cells which are known to be transformed, the phenotyping results being useful in planning a particular therapeutic regimen. For instance, very high levels of the marker polypeptide in sample cells is a powerful diagnostic and prognostic marker for a cancer, such as colon cancer. The observation of marker polypeptide level can be utilized in decisions regarding, e.g., the use of more aggressive therapies.

As set out above, one aspect of the present invention relates to diagnostic assays for determining, in the context of cells isolated from a patient, if the level of a marker polypeptide is significantly reduced in the sample cells. The term "significantly reduced" refers to a cell phenotype wherein the cell possesses a reduced cellular amount of the marker polypeptide relative to a normal cell of similar tissue origin. For example, a cell may have less than about 50%, 25%, 10%, or 5% of the marker polypeptide that a normal control cell. In particular, the assay evaluates the level of marker polypeptide in the test cells, and, preferably, compares the measured level with marker polypeptide detected in at least one control cell, e.g., a normal cell and/or a transformed cell of known phenotype.

Of particular importance to the subject invention is the ability to quantitate the level of marker polypeptide as determined by the number of cells associated with a normal or abnormal marker polypeptide level. The number of cells with a particular marker polypeptide phenotype may then be correlated with patient prognosis. In one embodiment of the invention, the marker polypeptide phenotype of the lesion is determined as a percentage of cells in a biopsy which are found to have abnormally high/low levels of the marker polypeptide. Such expression may be detected by immunohistochemical assays, dot-blot assays, ELISA and the like.

Where tissue samples are employed, immunohistochemical staining may be used to determine the number of cells having the marker polypeptide phenotype. For such staining, a multiblock of tissue is taken from the biopsy or other tissue sample and subjected to proteolytic hydrolysis, employing such agents as protease K or pepsin. In certain embodiments, it may be desirable to isolate a nuclear fraction from the sample cells and detect the level of the marker polypeptide in the nuclear fraction.

The tissue samples are fixed by treatment with a reagent such as formalin, glutaraldehyde, methanol, or the like. The samples are then incubated with an antibody, preferably a monoclonal antibody, with binding specificity for the marker polypeptides. This antibody may be conjugated to a label for subsequent detection of binding. Samples are incubated for a time sufficient for formation of the immuno-complexes. Binding of the antibody is then detected by virtue of a label conjugated to this antibody. Where the antibody is unlabeled, a second labeled antibody may be employed, e.g., which is specific for the isotype of the anti-marker polypeptide antibody. Examples of labels which may be employed include radionuclides, fluorescers, chemiluminescers, enzymes and the like.

Where enzymes are employed, the substrate for the enzyme may be added to the samples to provide a colored or fluorescent product. Examples of suitable enzymes for use in conjugates include horseradish peroxidase, alkaline phosphatase, malate dehydrogenase and the like. Where not commercially available, such antibody-enzyme conjugates are readily produced by techniques known to those skilled in the art.

In one embodiment, the assay is performed as a dot blot assay. The dot blot assay finds particular application where tissue samples are employed as it allows determination of the average amount of the marker polypeptide associated with a single cell by correlating the amount of marker polypeptide in a cell-free extract produced from a predetermined number of cells.

It is well established in the cancer literature that tumor cells of the same type (e.g., breast and/or colon tumor cells) may not show uniformly increased expression of individual oncogenes or uniformly decreased expression of individual tumor suppressor genes. There may also be varying levels of expression of a given marker gene even between cells of a given type of cancer, further emphasizing the need for reliance on a battery of tests rather than a single test. Accordingly, in one aspect, the invention provides for a battery of tests utilizing a number of probes of the invention, in order to improve the reliability and/or accuracy of the diagnostic test.

In one embodiment, the present invention also provides a method wherein nucleic acid probes are immobilized on a DNA chip in an organized array. Oligonucleotides can be bound to a solid support by a variety of processes, including lithography. For example a chip can hold up to 250,000 oligonucleotides (GeneChip,

Affymetrix). These nucleic acid probes comprise a nucleotide sequence at least about 12 nucleotides in length, preferably at least about 15 nucleotides, more preferably at least about 25 nucleotides, and most preferably at least about 40 nucleotides, and up to all or nearly all of a sequence which is complementary to a portion of the coding sequence of a marker nucleic acid sequence represented by SEQ ID Nos: 1-544 and is differentially expressed in tumor cells, such as colon cancer cells. The present invention provides significant advantages over the available tests for various cancers, such as colon cancer, because it increases the reliability of the test by providing an array of nucleic acid markers on a single chip.

The method includes obtaining a biopsy, which is optionally fractionated by cryostat sectioning to enrich tumor cells to about 80% of the total cell population. The DNA or RNA is then extracted, amplified, and analyzed with a DNA chip to determine the presence of absence of the marker nucleic acid sequences.

In one embodiment, the nucleic acid probes are spotted onto a substrate in a two-dimensional matrix or array. Samples of nucleic acids can be labeled and then hybridized to the probes. Double-stranded nucleic acids, comprising the labeled sample nucleic acids bound to probe nucleic acids, can be detected once the unbound portion of the sample is washed away.

The probe nucleic acids can be spotted on substrates including glass, nitrocellulose, etc. The probes can be bound to the substrate by either covalent bonds or by non-specific interactions, such as hydrophobic interactions. The sample nucleic acids can be labeled using radioactive labels, fluorophores, chromophores, etc.

Techniques for constructing arrays and methods of using these arrays are described in EP No. 0 799 897; PCT No. WO 97/29212; PCT No. WO 97/27317; EP No. 0 785 280; PCT No. WO 97/02357; U.S. Pat. No. 5,593,839; U.S. Pat. No. 5,578,832; EP No. 0 728 520; U.S. Pat. No. 5,599,695; EP No. 0 721 016; U.S. Pat. No. 5,556,752; PCT No. WO 95/22058; and U.S. Pat. No. 5,631,734.

Further, arrays can be used to examine differential expression of genes and can be used to determine gene function. For example, arrays of the instant nucleic acid sequences can be used to determine if any of the nucleic acid sequences are differentially expressed between normal cells and cancer cells, for example. High expression of a particular message in a cancer cell, which is not observed in a corresponding normal cell, can indicate a cancer specific protein.

In yet another embodiment, the invention contemplates using a panel of antibodies which are generated against the marker polypeptides of this invention, which polypeptides are encoded by SEQ ID Nos: 1-544. Such a panel of antibodies may be used as a reliable diagnostic probe for colon cancer. The assay of the present invention comprises contacting a biopsy sample containing cells, e.g., colon cells, with a panel of antibodies to one or more of the encoded products to determine the presence or absence of the marker polypeptides.

The diagnostic methods of the subject invention may also be employed as follow-up to treatment, e.g., quantitation of the level of marker polypeptides may be indicative of the effectiveness of current or previously employed cancer therapies as well as the effect of these therapies upon patient prognosis.

Accordingly, the present invention makes available diagnostic assays and reagents for detecting gain and/or loss of marker polypeptides from a cell in order to aid in the diagnosis and phenotyping of proliferative disorders arising from, for example, tumorigenic transformation of cells.

The diagnostic assays described above can be adapted to be used as prognostic assays, as well. Such an application takes advantage of the sensitivity of the assays of the invention to events which take place at characteristic stages in the progression of a tumor. For example, a given marker gene may be up- or downregulated at a very early stage, perhaps before the cell is irreversibly committed to developing into a malignancy, while another marker gene may be characteristically up or down regulated only at a much later stage. Such a method could involve the steps of contacting the mRNA of a test cell with a nucleic acid probe derived from a given marker nucleic acid which is expressed at different characteristic levels in cancerous or precancerous cells at different stages of tumor progression, and determining the approximate amount of hybridization of the probe to the mRNA of the cell, such amount being an indication of the level of expression of the gene in the cell, and thus an indication of the stage of tumor progression of the cell; alternatively, the assay can be carried out with an antibody specific for the gene product of the given marker nucleic acid, contacted with the proteins of the test cell. A battery of such tests will disclose not only the existence and location of a tumor, but also will allow the clinician to select the mode of treatment most appropriate for the tumor, and to predict the likelihood of success of that treatment.

The methods of the invention can also be used to follow the clinical course of a tumor. For example, the assay of the invention can be applied to a tissue sample from a patient; following treatment of the patient for the cancer, another tissue sample is taken and the test repeated. Successful treatment will result in either removal of all cells which demonstrate differential expression characteristic of the cancerous or precancerous cells, or a substantial increase in expression of the gene in those cells, perhaps approaching or even surpassing normal levels.

In yet another embodiment, the invention provides methods for determining whether a subject is at risk for developing a disease, such as a predisposition to develop cancer, for example colon cancer, associated with an aberrant activity of any one of the polypeptides encoded by nucleic acids of SEQ ID Nos: 1-544, wherein the aberrant activity of the polypeptide is characterized by detecting the presence or absence of a genetic lesion characterized by at least one of (i) an alteration affecting the integrity of a gene encoding a marker polypeptides, or (ii) the mis-expression of the encoding nucleic acid. To illustrate, such genetic lesions can be detected by ascertaining the existence of at least one of (i) a deletion of one or more nucleotides from the nucleic acid sequence, (ii) an addition of one or more nucleotides to the nucleic acid sequence, (iii) a substitution of one or more nucleotides of the nucleic acid sequence, (iv) a gross chromosomal rearrangement of the nucleic acid sequence, (v) a gross alteration in the level of a messenger RNA transcript of the nucleic acid sequence, (vii) aberrant modification of the nucleic acid sequence, such as of the methylation pattern of the genomic DNA, (vii) the presence of a non-wild type splicing pattern of a messenger RNA transcript of the gene, (viii) a non-wild type level of the marker polypeptide, (ix) allelic loss of the gene, and/or (x) inappropriate post-translational modification of the marker polypeptide.

The present invention provides assay techniques for detecting lesions in the encoding nucleic acid sequence. These methods include, but are not limited to, methods involving sequence analysis, Southern blot hybridization, restriction enzyme site mapping, and methods involving detection of absence of nucleotide pairing between the nucleic acid to be analyzed and a probe.

Specific diseases or disorders, e.g., genetic diseases or disorders, are associated with specific allelic variants of polymorphic regions of certain genes, which do not necessarily encode a mutated protein. Thus, the presence of a specific

allelic variant of a polymorphic region of a gene in a subject can render the subject susceptible to developing a specific disease or disorder. Polymorphic regions in genes, can be identified, by determining the nucleotide sequence of genes in populations of individuals. If a polymorphic region is identified, then the link with a specific disease can be determined by studying specific populations of individuals, e.g, individuals which developed a specific disease, such as colon cancer. A polymorphic region can be located in any region of a gene, e.g., exons, in coding or non coding regions of exons, introns, and promoter region.

In an exemplary embodiment, there is provided a nucleic acid composition comprising a nucleic acid probe including a region of nucleotide sequence which is capable of hybridizing to a sense or antisense sequence of a gene or naturally occurring mutants thereof, or 5' or 3' flanking sequences or intronic sequences naturally associated with the subject genes or naturally occurring mutants thereof. The nucleic acid of a cell is rendered accessible for hybridization, the probe is contacted with the nucleic acid of the sample, and the hybridization of the probe to the sample nucleic acid is detected. Such techniques can be used to detect lesions or allelic variants at either the genomic or mRNA level, including deletions, substitutions, etc., as well as to determine mRNA transcript levels.

A preferred detection method is allele specific hybridization using probes overlapping the mutation or polymorphic site and having about 5, 10, 20, 25, or 30 nucleotides around the mutation or polymorphic region. In a preferred embodiment of the invention, several probes capable of hybridizing specifically to allelic variants are attached to a solid phase support, e.g., a "chip". Mutation detection analysis using these chips comprising oligonucleotides, also termed "DNA probe arrays" is described e.g., in Cronin et al. (1996) Human Mutation 7:244. In one embodiment, a chip comprises all the allelic variants of at least one polymorphic region of a gene. The solid phase support is then contacted with a test nucleic acid and hybridization to the specific probes is detected. Accordingly, the identity of numerous allelic variants of one or more genes can be identified in a simple hybridization experiment.

In certain embodiments, detection of the lesion comprises utilizing the probe/primer in a polymerase chain reaction (PCR) (see, e.g. U.S. Patent Nos. 4,683,195 and 4,683,202), such as anchor PCR or RACE PCR, or, alternatively, in a ligase chain reaction (LCR) (see, e.g., Landegran *et al.* (1988) *Science* 241:1077-

1080; and Nakazawa *et al.* (1994) *PNAS* 91:360-364), the latter of which can be particularly useful for detecting point mutations in the gene (see Abravaya et al. (1995) *Nuc Acid Res* 23:675-682). In a merely illustrative embodiment, the method includes the steps of (i) collecting a sample of cells from a patient, (ii) isolating nucleic acid (e.g., genomic, mRNA or both) from the cells of the sample, (iii) contacting the nucleic acid sample with one or more primers which specifically hybridize to a nucleic acid sequence under conditions such that hybridization and amplification of the nucleic acid (if present) occurs, and (iv) detecting the presence or absence of an amplification product, or detecting the size of the amplification product and comparing the length to a control sample. It is anticipated that PCR and/or LCR may be desirable to use as a preliminary amplification step in conjunction with any of the techniques used for detecting mutations described herein.

Alternative amplification methods include: self sustained sequence replication (Guatelli, J.C. *et al.*, 1990, Proc. Natl. Acad. Sci. USA 87:1874-1878), transcriptional amplification system (Kwoh, D.Y. et al., 1989, Proc. Natl. Acad. Sci. USA 86:1173-1177), Q-Beta Replicase (Lizardi, P.M. *et al.*, 1988, Bio/Technology 6:1197), or any other nucleic acid amplification method, followed by the detection of the amplified molecules using techniques well known to those of skill in the art. These detection schemes are especially useful for the detection of nucleic acid molecules if such molecules are present in very low numbers.

In a preferred embodiment of the subject assay, mutations in, or allelic variants, of a gene from a sample cell are identified by alterations in restriction enzyme cleavage patterns. For example, sample and control DNA is isolated, amplified (optionally), digested with one or more restriction endonucleases, and fragment length sizes are determined by gel electrophoresis. Moreover, the use of sequence specific ribozymes (see, for example, U.S. Patent No. 5,498,531) can be used to score for the presence of specific mutations by development or loss of a ribozyme cleavage site.

Another aspect of the invention is directed to the identification of agents capable of modulating the differentiation and proliferation of cells characterized by aberrant proliferation. In this regard, the invention provides assays for determining compounds that modulate the expression of the marker nucleic acids (SEQ ID Nos: 1-544) and/or alter for example, inhibit the bioactivity of the encoded polypeptide.

Several in vivo methods can be used to identify compounds that modulate expression of the marker nucleic acids (SEQ ID Nos: 1-544) and/or alter for example, inhibit the bioactivity of the encoded polypeptide.

Drug screening is performed by adding a test compound to a sample of cells, and monitoring the effect. A parallel sample which does not receive the test compound is also monitored as a control. The treated and untreated cells are then compared by any suitable phenotypic criteria, including but not limited to microscopic analysis, viability testing, ability to replicate, histological examination, the level of a particular RNA or polypeptide associated with the cells, the level of enzymatic activity expressed by the cells or cell lysates, and the ability of the cells to interact with other cells or compounds. Differences between treated and untreated cells indicates effects attributable to the test compound.

Desirable effects of a test compound include an effect on any phenotype that was conferred by the cancer-associated marker nucleic acid sequence. Examples include a test compound that limits the overabundance of mRNA, limits production of the encoded protein, or limits the functional effect of the protein. The effect of the test compound would be apparent when comparing results between treated and untreated cells.

The invention thus also encompasses methods of screening for agents which inhibit expression of the nucleic acid markers (SEQ ID Nos: 1-544) in vitro, comprising exposing a cell or tissue in which the marker nucleic acid mRNA is detectable in cultured cells to an agent in order to determine whether the agent is capable of inhibiting production of the mRNA; and determining the level of mRNA in the exposed cells or tissue, wherein a decrease in the level of the mRNA after exposure of the cell line to the agent is indicative of inhibition of the marker nucleic acid mRNA production.

Alternatively, the screening method may include in vitro screening of a cell or tissue in which marker protein is detectable in cultured cells to an agent suspected of inhibiting production of the marker protein; and determining the level of the marker protein in the cells or tissue, wherein a decrease in the level of marker protein after exposure of the cells or tissue to the agent is indicative of inhibition of marker protein production.

The invention also encompasses in vivo methods of screening for agents which inhibit expression of the marker nucleic acids, comprising exposing a mammal having tumor cells in which marker mRNA or protein is detectable to an agent suspected of inhibiting production of marker mRNA or protein; and determining the level of marker mRNA or protein in tumor cells of the exposed mammal. A decrease in the level of marker mRNA or protein after exposure of the mammal to the agent is indicative of inhibition of marker nucleic acid expression.

Accordingly, the invention provides a method comprising incubating a cell expressing the marker nucleic acids (SEQ ID Nos: 1-544) with a test compound and measuring the mRNA or protein level. The invention further provides a method for quantitatively determining the level of expression of the marker nucleic acids in a cell population, and a method for determining whether an agent is capable of increasing or decreasing the level of expression of the marker nucleic acids in a cell population. The method for determining whether an agent is capable of increasing or decreasing the level of expression of the marker nucleic acids in a cell population comprises the steps of (a) preparing cell extracts from control and agent-treated cell populations, (b) isolating the marker polypeptides from the cell extracts, (c) quantifying (e.g., in parallel) the amount of an immunocomplex formed between the marker polypeptide and an antibody specific to said polypeptide. The marker polypeptides of this invention may also be quantified by assaying for its bioactivity. Agents that induce increased the marker nucleic acid expression may be identified by their ability to increase the amount of immunocomplex formed in the treated cell as compared with the amount of the immunocomplex formed in the control cell. In a similar manner, agents that decrease expression of the marker nucleic acid may be identified by their ability to decrease the amount of the immunocomplex formed in the treated cell extract as compared to the control cell.

mRNA levels can be determined by Northern blot hybridization. mRNA levels can also be determined by methods involving PCR. Other sensitive methods for measuring mRNA, which can be used in high throughput assays, e.g., a method using a DELFIA endpoint detection and quantification method, are described, e.g., in Webb and Hurskainen (1996) *Journal of Biomolecular Screening* 1:119. Marker protein levels can be determined by immunoprecipitations or immunohistochemistry using an

antibody that specifically recognizes the protein product encoded by SEQ ID Nos: 1-544.

Agents that are identified as active in the drug screening assay are candidates to be tested for their capacity to block cell proliferation activity. These agents would be useful for treating a disorder involving aberrant growth of cells, especially colon cells.

A variety of assay formats will suffice and, in light of the present disclosure, those not expressly described herein will nevertheless be comprehended by one of ordinary skill in the art. For instance, the assay can be generated in many different formats, and include assays based on cell-free systems, e.g., purified proteins or cell lysates, as well as cell-based assays which utilize intact cells.

In many drug screening programs which test libraries of compounds and natural extracts, high throughput assays are desirable in order to maximize the number of compounds surveyed in a given period of time. Assays of the present invention which are performed in cell-free systems, such as may be derived with purified or semi-purified proteins or with lysates, are often preferred as "primary" screens in that they can be generated to permit rapid development and relatively easy detection of an alteration in a molecular target which is mediated by a test compound. Moreover, the effects of cellular toxicity and/or bioavailability of the test compound can be generally ignored in the *in vitro* system, the assay instead being focused primarily on the effect of the drug on the molecular target as may be manifest in an alteration of binding affinity with other proteins or changes in enzymatic properties of the molecular target.

A. Use of Nucleic Acids as Probes in Mapping and in Tissue Profiling Probes

Polynucleotide probes as described above, e.g., comprising at least 12 contiguous nucleotides selected from the nucleotide sequence of an nucleic acid as shown in SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, are used for a variety of purposes, including identification of human chromosomes and determining transcription levels. Additional disclosure about preferred regions of the nucleic acid sequences is found in the accompanying tables.

The nucleotide probes are labeled, for example, with a radioactive, fluorescent, biotinylated, or chemiluminescent label, and detected by well known methods appropriate for the particular label selected. Protocols for hybridizing nucleotide probes to preparations of metaphase chromosomes are also well known in the art. A nucleotide probe will hybridize specifically to nucleotide sequences in the chromosome preparations which are complementary to the nucleotide sequence of the probe. A probe that hybridizes specifically to a nucleic acid should provide a detection signal at least 5-, 10-, or 20-fold higher than the background hybridization provided with other unrelated sequences.

In a non-limiting example, commercial programs are available for identifying regions of chromosomes commonly associated with disease, such as cancer. Nucleic acids of the invention can be used to probe these regions. For example, if, through profile searching, a nucleic acid is identified as corresponding to a gene encoding a kinase, its ability to bind to a cancer-related chromosomal region will suggest its role as a kinase in one or more stages of tumor cell development/growth. Although some experimentation would be required to elucidate the role, the nucleic acid constitutes a new material for isolating a specific protein that has potential for developing a cancer diagnostic or therapeutic.

Nucleotide probes are used to detect expression of a gene corresponding to the nucleic acid. For example, in Northern blots, mRNA is separated electrophoretically and contacted with a probe. A probe is detected as hybridizing to an mRNA species of a particular size. The amount of hybridization is quantitated to determine relative amounts of expression, for example under a particular condition. Probes are also used to detect products of amplification by polymerase chain reaction. The products of the reaction are hybridized to the probe and hybrids are detected. Probes are used for in situ hybridization to cells to detect expression. Probes can also be used in vivo for diagnostic detection of hybridizing sequences. Probes are typically labeled with a radioactive isotope. Other types of detectable labels may be used such as chromophores, fluorophores, and enzymes.

Expression of specific mRNA can vary in different cell types and can be tissue specific. This variation of mRNA levels in different cell types can be exploited with nucleic acid probe assays to determine tissue types. For example, PCR, branched DNA probe assays, or blotting techniques utilizing nucleic acid probes substantially

identical or complementary to nucleic acids of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, can determine the presence or absence of target cDNA or mRNA.

Examples of a nucleotide hybridization assay are described in Urdea *et al.*, PCT WO92/02526 and Urdea *et al.*, U.S. Patent No. 5,124,246, both incorporated herein by reference. The references describe an example of a sandwich nucleotide hybridization assay.

Alternatively, the Polymerase Chain Reaction (PCR) is another means for detecting small amounts of target nucleic acids, as described in Mullis *et al.*, *Meth. Enzymol.* (1987) *155*:335-350; U.S. Patent No. 4,683,195; and U.S. Patent No. 4,683,202, all incorporated herein by reference. Two primer polynucleotides nucleotides hybridize with the target nucleic acids and are used to prime the reaction. The primers may be composed of sequence within or 3' and 5' to the polynucleotides of the Sequence Listing. Alternatively, if the primers are 3' and 5' to these polynucleotides, they need not hybridize to them or the complements. A thermostable polymerase creates copies of target nucleic acids from the primers using the original target nucleic acids as a template. After a large amount of target nucleic acids is generated by the polymerase, it is detected by methods such as Southern blots. When using the Southern blot method, the labeled probe will hybridize to a polynucleotide of the Sequence Listing or complement.

Furthermore, mRNA or cDNA can be detected by traditional blotting techniques described in Sambrook *et al.*, "Molecular Cloning: A Laboratory Manual" (New York, Cold Spring Harbor Laboratory, 1989). mRNA or cDNA generated from mRNA using a polymerase enzyme can be purified and separated using gel electrophoresis. The nucleic acids on the gel are then blotted onto a solid support, such as nitrocellulose. The solid support is exposed to a labeled probe and then washed to remove any unhybridized probe. Next, the duplexes containing the labeled probe are detected. Typically, the probe is labeled with radioactivity.

<u>Mapping</u>

Nucleic acids of the present invention are used to identify a chromosome on which the corresponding gene resides. Using fluorescence in situ hybridization

(FISH) on normal metaphase spreads, comparative genomic hybridization allows total genome assessment of changes in relative copy number of DNA sequences. See Schwartz and Samad, *Current Opinions in Biotechnology* (1994) *8*:70-74; Kallioniemi *et al., Seminars in Cancer Biology* (1993) *4*:41-46; Valdes and Tagle, *Methods in Molecular Biology* (1997) *68*:1, Boultwood, ed., Human Press, Totowa, NJ.

Preparations of human metaphase chromosomes are prepared using standard cytogenetic techniques from human primary tissues or cell lines. Nucleotide probes comprising at least 12 contiguous nucleotides selected from the nucleotide sequence of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, are used to identify the corresponding chromosome. The nucleotide probes are labeled, for example, with a radioactive, fluorescent, biotinylated, or chemiluminescent label, and detected by well known methods appropriate for the particular label selected. Protocols for hybridizing nucleotide probes to preparations of metaphase chromosomes are also well known in the art. A nucleotide probe will hybridize specifically to nucleotide sequences in the chromosome preparations that are complementary to the nucleotide sequence of the probe. A probe that hybridizes specifically to a target gene provides a detection signal at least 5-, 10-, or 20-fold higher than the background hybridization provided with unrelated coding sequences.

Nucleic acids are mapped to particular chromosomes using, for example, radiation hybrids or chromosome-specific hybrid panels. See Leach *et al., Advances in Genetics*, (1995) *33*:63-99; Walter *et al., Nature Genetics* (1994) *7*:22-28; Walter and Goodfellow, *Trends in Genetics* (1992) *9*:352. Panels for radiation hybrid mapping are available from Research Genentics, Inc., Huntsville, Alabama, USA. Databases for markers using various panels are available via the world wide web at http:/F/shgc-www.stanford.edu; and other locations. The statistical program RHMAP can be used to construct a map based on the data from radiation hybridization with a measure of the relative likelihood of one order versus another. RHMAP is available via the world wide web at http://www.sph.umich.edu/group/statgen/software.

Such mapping can be useful in identifying the function of the target gene by its proximity to other genes with known function. Function can also be assigned to the target gene when particular syndromes or diseases map to the same chromosome.

Tissue Profiling

The nucleic acids of the present invention can be used to determine the tissue type from which a given sample is derived. For example, a metastatic lesion is identified by its developmental organ or tissue source by identifying the expression of a particular marker of that organ or tissue. If a nucleic acid is expressed only in a specific tissue type, and a metastatic lesion is found to express that nucleic acid, then the developmental source of the lesion has been identified. Expression of a particular nucleic acid is assayed by detection of either the corresponding mRNA or the protein product. Immunological methods, such as antibody staining, are used to detect a particular protein product. Hybridization methods may be used to detect particular mRNA species, including but not limited to in situ hybridization and Northern blotting.

Use of Polymorphisms

A nucleic acid will be useful in forensics, genetic analysis, mapping, and diagnostic applications if the corresponding region of a gene is polymorphic in the human population. A particular polymorphic form of the nucleic acid may be used to either identify a sample as deriving from a suspect or rule out the possibility that the sample derives from the suspect. Any means for detecting a polymorphism in a gene are used, including but not limited to electrophoresis of protein polymorphic variants, differential sensitivity to restriction enzyme cleavage, and hybridization to an allele-specific probe.

B. Use of Nucleic Acids and Encoded Polypeptides to Raise Antibodies

Expression products of a nucleic acid, the corresponding mRNA or cDNA, or the corresponding complete gene are prepared and used for raising antibodies for experimental, diagnostic, and therapeutic purposes. For nucleic acids to which a corresponding gene has not been assigned, this provides an additional method of identifying the corresponding gene. The nucleic acid or related cDNA is expressed as described above, and antibodies are prepared. These antibodies are specific to an epitope on the encoded polypeptide, and can precipitate or bind to the corresponding native protein in a cell or tissue preparation or in a cell-free extract of an in vitro expression system.

Immunogens for raising antibodies are prepared by mixing the polypeptides encoded by the nucleic acids of the present invention with adjuvants. Alternatively, polypeptides are made as fusion proteins to larger immunogenic proteins. Polypeptides are also covalently linked to other larger immunogenic proteins, such as keyhole limpet hemocyanin. Immunogens are typically administered intradermally, subcutaneously, or intramuscularly. Immunogens are administered to experimental animals such as rabbits, sheep, and mice, to generate antibodies. Optionally, the animal spleen cells are isolated and fused with myeloma cells to form hybridomas which secrete monoclonal antibodies. Such methods are well known in the art. According to another method known in the art, the nucleic acid is administered directly, such as by intramuscular injection, and expressed in vivo. The expressed protein generates a variety of protein-specific immune responses, including production of antibodies, comparable to administration of the protein.

Preparations of polyclonal and monoclonal antibodies specific for nucleic acid-encoded proteins and polypeptides are made using standard methods known in the art. The antibodies specifically bind to epitopes present in the polypeptides encoded by a nucleic acid of SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto. In another embodiment, the antibodies specifically bind to epitopes present in a polypeptide encoded by SEQ ID Nos. 1-544. Typically, at least about 6, 8, 10, or 12 contiguous amino acids are required to form an epitope. However, epitopes which involve non-contiguous amino acids may require more, for example, at least about 15, 25, or 50 amino acids. A short sequence of a nucleic acid may then be unsuitable for use as an epitope to raise antibodies for identifying the corresponding novel protein, because of the potential for cross-reactivity with a known protein. However, the antibodies may be useful for other purposes, particularly if they identify common structural features of a known protein and a novel polypeptide encoded by a nucleic acid of the invention.

Antibodies that specifically bind to human nucleic acid-encoded polypeptides should provide a detection signal at least about 5-, 10-, or 20-fold higher than a detection signal provided with other proteins when used in Western blots or other immunochemical assays. Preferably, antibodies that specifically bind nucleic acid T-

encoded polypeptides do not detect other proteins in immunochemical assays and can immunoprecipitate nucleic acid-encoded proteins from solution.

To test for the presence of serum antibodies to the nucleic acid-encoded polypeptide in a human population, human antibodies are purified by methods well known in the art. Preferably, the antibodies are affinity purified by passing antiserum over a column to which a nucleic acid-encoded protein, polypeptide, or fusion protein is bound. The bound antibodies can then be eluted from the column, for example using a buffer with a high salt concentration.

In addition to the antibodies discussed above, genetically engineered antibody derivatives are made, such as single chain antibodies.

Antibodies may be made by using standard protocols known in the art (See, for example, Antibodies: A Laboratory Manual ed. by Harlow and Lane (Cold Spring Harbor Press: 1988)). A mammal, such as a mouse, hamster, or rabbit can be immunized with an immunogenic form of the peptide (e.g., a mammalian polypeptide or an antigenic fragment which is capable of eliciting an antibody response, or a fusion protein as described above).

In one aspect, this invention includes monoclonal antibodies that show a subject polypeptide is highly expressed in colorectal tissue or tumor tissue, especially colon cancer tissue or colon cancer-derived cell lines. Therefore, in one embodiment, this invention provides a diagnostic tool for the analysis of expression of a subject polypeptide in general, and in particular, as a diagnostic for colon cancer.

Techniques for conferring immunogenicity on a protein or peptide include conjugation to carriers or other techniques well known in the art. An immunogenic portion of a protein can be administered in the presence of adjuvant. The progress of immunization can be monitored by detection of antibody titers in plasma or serum. Standard ELISA or other immunoassays can be used with the immunogen as antigen to assess the levels of antibodies. In a preferred embodiment, the subject antibodies are immunospecific for antigenic determinants of a protein of a mammal, e.g., antigenic determinants of a protein encoded by one of SEQ ID Nos. 1-544 or closely related homologs (e.g., at least 90% identical, and more preferably at least 95% identical).

Following immunization of an animal with an antigenic preparation of a polypeptide, antisera can be obtained and, if desired, polyclonal antibodies isolated

from the serum. To produce monoclonal antibodies, antibody-producing cells (lymphocytes) can be harvested from an immunized animal and fused by standard somatic cell fusion procedures with immortalizing cells such as myeloma cells to yield hybridoma cells. Such techniques are well known in the art, and include, for example, the hybridoma technique (originally developed by Kohler and Milstein, (1975) Nature, 256: 495-497), the human B cell hybridoma technique (Kozbar *et al.*, (1983) Immunology Today, 4: 72), and the EBV-hybridoma technique to produce human monoclonal antibodies (Cole et al., (1985) Monoclonal Antibodies and Cancer Therapy, Alan R. Liss, Inc. pp. 77-96). Hybridoma cells can be screened immunochemically for production of antibodies specifically reactive with a polypeptide of the present invention and monoclonal antibodies isolated from a culture comprising such hybridoma cells.

The term antibody as used herein is intended to include fragments thereof which are also specifically reactive with one of the subject polypeptides. Antibodies can be fragmented using conventional techniques and the fragments screened for utility in the same manner as described above for whole antibodies. For example, $F(ab)_2$ fragments can be generated by treating antibody with pepsin. The resulting $F(ab)_2$ fragment can be treated to reduce disulfide bridges to produce Fab fragments. The antibody of the present invention is further intended to include bispecific, single-chain, and chimeric and humanized molecules having affinity for a polypeptide conferred by at least one CDR region of the antibody. In preferred embodiments, the antibodies, the antibody further comprises a label attached thereto and able to be detected, (e.g., the label can be a radioisotope, fluorescent compound, chemiluminescent compound, enzyme, or enzyme co-factor).

Antibodies can be used, e.g., to monitor protein levels in an individual for determining, e.g., whether a subject has a disease or condition, such as colon cancer, associated with an aberrant protein level, or allowing determination of the efficacy of a given treatment regimen for an individual afflicted with such a disorder. The level of polypeptides may be measured from cells in bodily fluid, such as in blood samples.

Another application of antibodies of the present invention is in the immunological screening of cDNA libraries constructed in expression vectors such as gt11, gt18-23, ZAP, and ORF8. Messenger libraries of this type, having coding sequences inserted in the correct reading frame and orientation, can produce fusion

proteins. For instance, gt11 will produce fusion proteins whose amino termini consist of ß-galactosidase amino acid sequences and whose carboxyl termini consist of a foreign polypeptide. Antigenic epitopes of a protein, e.g., other orthologs of a particular protein or other paralogs from the same species, can then be detected with antibodies, as, for example, reacting nitrocellulose filters lifted from infected plates with antibodies. Positive phage detected by this assay can then be isolated from the infected plate. Thus, the presence of homologs can be detected and cloned from other animals, as can alternate isoforms (including splicing variants) from humans.

In another embodiment, a panel of monoclonal antibodies may be used, wherein each of the epitope's involved functions are represented by a monoclonal antibody. Loss or perturbation of binding of a monoclonal antibody in the panel would be indicative of a mutational attention of the protein and thus of the corresponding gene.

C. Differential Expression

The present invention also provides a method to identify abnormal or diseased tissue in a human. For nucleic acids corresponding to profiles of protein families as described above, the choice of tissue may be dictated by the putative biological function. The expression of a gene corresponding to a specific nucleic acid is compared between a first tissue that is suspected of being diseased and a second, normal tissue of the human. The normal tissue is any tissue of the human, especially those that express the target gene including, but not limited to, brain, thymus, testis, heart, prostate, placenta, spleen, small intestine, skeletal muscle, pancreas, and the mucosal lining of the colon.

The tissue suspected of being abnormal or diseased can be derived from a different tissue type of the human, but preferably it is derived from the same tissue type; for example an intestinal polyp or other abnormal growth should be compared with normal intestinal tissue. A difference between the target gene, mRNA, or protein in the two tissues which are compared, for example in molecular weight, amino acid or nucleotide sequence, or relative abundance, indicates a change in the gene, or a gene which regulates it, in the tissue of the human that was suspected of being diseased.

The target genes in the two tissues are compared by any means known in the art. For example, the two genes are sequenced, and the sequence of the gene in the tissue suspected of being diseased is compared with the gene sequence in the normal tissue. The target genes, or portions thereof, in the two tissues are amplified, for example using nucleotide primers based on the nucleotide sequence shown in the Sequence Listing, using the polymerase chain reaction. The amplified genes or portions of genes are hybridized to nucleotide probes selected from a corresponding nucleotide sequence shown SEQ ID No. 1-544. A difference in the nucleotide sequence of the target gene in the tissue suspected of being diseased compared with the normal nucleotide sequence suggests a role of the nucleic acid-encoded proteins in the disease, and provides a lead for preparing a therapeutic agent. The nucleotide probes are labeled by a variety of methods, such as radiolabeling, biotinylation, or labeling with fluorescent or chemiluminescent tags, and detected by standard methods known in the art.

Alternatively, target mRNA in the two tissues is compared. PolyA$^+$ RNA is isolated from the two tissues as is known in the art. For example, one of skill in the art can readily determine differences in the size or amount of target mRNA transcripts between the two tissues using Northern blots and nucleotide probes selected from the nucleotide sequence shown in the Sequence Listing. Increased or decreased expression of a target mRNA in a tissue sample suspected of being diseased, compared with the expression of the same target mRNA in a normal tissue, suggests that the expressed protein has a role in the disease, and also provides a lead for preparing a therapeutic agent.

Any method for analyzing proteins is used to compare two nucleic acid-encoded proteins from matched samples. The sizes of the proteins in the two tissues are compared, for example, using antibodies of the present invention to detect nucleic acid-encoded proteins in Western blots of protein extracts from the two tissues. Other changes, such as expression levels and subcellular localization, can also be detected immunologically, using antibodies to the corresponding protein. A higher or lower level of nucleic acid-encoded protein expression in a tissue suspected of being diseased, compared with the same nucleic acid-encoded protein expression level in a normal tissue, is indicative that the expressed protein has a role in the disease, and provides another lead for preparing a therapeutic agent.

Similarly, comparison of gene sequences or of gene expression products, e.g., mRNA and protein, between a human tissue that is suspected of being diseased and a normal tissue of a human, are used to follow disease progression or remission in the human. Such comparisons of genes, mRNA, or protein are made as described above.

For example, increased or decreased expression of the target gene in the tissue suspected of being neoplastic can indicate the presence of neoplastic cells in the tissue. The degree of increased expression of the target gene in the neoplastic tissue relative to expression of the gene in normal tissue, or differences in the amount of increased expression of the target gene in the neoplastic tissue over time, is used to assess the progression of the neoplasia in that tissue or to monitor the response of the neoplastic tissue to a therapeutic protocol over time.

The expression pattern of any two cell types can be compared, such as low and high metastatic tumor cell lines, or cells from tissue which have and have not been exposed to a therapeutic agent. A genetic predisposition to disease in a human is detected by comparing an target gene, mRNA, or protein in a fetal tissue with a normal target gene, mRNA, or protein. Fetal tissues that are used for this purpose include, but are not limited to, amniotic fluid, chorionic villi, blood, and the blastomere of an in vitro-fertilized embryo. The comparable normal target gene is obtained from any tissue. The mRNA or protein is obtained from a normal tissue of a human in which the target gene is expressed. Differences such as alterations in the nucleotide sequence or size of the fetal target gene or mRNA, or alterations in the molecular weight, amino acid sequence, or relative abundance of fetal target protein, can indicate a germline mutation in the target gene of the fetus, which indicates a genetic predisposition to disease.

D. Use of Nucleic Acids, and Encoded Polypeptides to Screen for Peptide Analogs and Antagonists

Polypeptides encoded by the instant nucleic acids, e.g., SEQ ID Nos. 1-544, preferably SEQ ID Nos. 1-168, even more preferably SEQ ID Nos. 1-35, or a sequence complementary thereto, and corresponding full length genes can be used to screen peptide libraries to identify binding partners, such as receptors, from among the encoded polypeptides.

A library of peptides may be synthesized following the methods disclosed in U.S. Pat. No. 5,010,175, and in PCT WO 91/17823. As described below in brief, one prepares a mixture of peptides, which is then screened to identify the peptides exhibiting the desired signal transduction and receptor binding activity. In the '175 method, a suitable peptide synthesis support (e.g., a resin) is coupled to a mixture of appropriately protected, activated amino acids. The concentration of each amino acid in the reaction mixture is balanced or adjusted in inverse proportion to its coupling reaction rate so that the product is an equimolar mixture of amino acids coupled to the starting resin. The bound amino acids are then deprotected, and reacted with another balanced amino acid mixture to form an equimolar mixture of all possible dipeptides. This process is repeated until a mixture of peptides of the desired length (*e.g.*, hexamers) is formed. Note that one need not include all amino acids in each step: one may include only one or two amino acids in some steps (*e.g.*, where it is known that a particular amino acid is essential in a given position), thus reducing the complexity of the mixture. After the synthesis of the peptide library is completed, the mixture of peptides is screened for binding to the selected polypeptide. The peptides are then tested for their ability to inhibit or enhance activity. Peptides exhibiting the desired activity are then isolated and sequenced.

The method described in WO 91/17823 is similar. However, instead of reacting the synthesis resin with a mixture of activated amino acids, the resin is divided into twenty equal portions (or into a number of portions corresponding to the number of different amino acids to be added in that step), and each amino acid is coupled individually to its portion of resin. The resin portions are then combined, mixed, and again divided into a number of equal portions for reaction with the second amino acid. In this manner, each reaction may be easily driven to completion. Additionally, one may maintain separate "subpools" by treating portions in parallel, rather than combining all resins at each step. This simplifies the process of determining which peptides are responsible for any observed receptor binding or signal transduction activity.

In such cases, the subpools containing, *e.g.*, 1-2,000 candidates each are exposed to one or more polypeptides of the invention. Each subpool that produces a positive result is then resynthesized as a group of smaller subpools (sub-subpools) containing, *e.g.*, 20-100 candidates, and reassayed. Positive sub-subpools may be

resynthesized as individual compounds, and assayed finally to determine the peptides that exhibit a high binding constant. These peptides can be tested for their ability to inhibit or enhance the native activity. The methods described in WO 91/7823 and U.S. Patent No. 5,194,392 (herein incorporated by reference) enable the preparation of such pools and subpools by automated techniques in parallel, such that all synthesis and resynthesis may be performed in a matter of days.

Peptide agonists or antagonists are screened using any available method, such as signal transduction, antibody binding, receptor binding, mitogenic assays, chemotaxis assays, etc. The methods described herein are presently preferred. The assay conditions ideally should resemble the conditions under which the native activity is exhibited *in vivo*, that is, under physiologic pH, temperature, and ionic strength. Suitable agonists or antagonists will exhibit strong inhibition or enhancement of the native activity at concentrations that do not cause toxic side effects in the subject. Agonists or antagonists that compete for binding to the native polypeptide may require concentrations equal to or greater than the native concentration, while inhibitors capable of binding irreversibly to the polypeptide may be added in concentrations on the order of the native concentration.

The end results of such screening and experimentation will be at least one novel polypeptide binding partner, such as a receptor, encoded by a nucleic acid of the invention, and at least one peptide agonist or antagonist of the novel binding partner. Such agonists and antagonists can be used to modulate, enhance, or inhibit receptor function in cells to which the receptor is native, or in cells that possess the receptor as a result of genetic engineering. Further, if the novel receptor shares biologically important characteristics with a known receptor, information about agonist/antagonist binding may help in developing improved agonists/antagonists of the known receptor.

E. Pharmaceutical Compositions and Therapeutic Uses

Pharmaceutical compositions can comprise polypeptides, antibodies, or polynucleotides of the claimed invention. The pharmaceutical compositions will comprise a therapeutically effective amount of either polypeptides, antibodies, or polynucleotides of the claimed invention.

The term "therapeutically effective amount" as used herein refers to an amount of a therapeutic agent to treat, ameliorate, or prevent a desired disease or condition, or

to exhibit a detectable therapeutic or preventative effect. The effect can be detected by, for example, chemical markers or antigen levels. Therapeutic effects also include reduction in physical symptoms, such as decreased body temperature. The precise effective amount for a subject will depend upon the subject's size and health, the nature and extent of the condition, and the therapeutics or combination of therapeutics selected for administration. Thus, it is not useful to specify an exact effective amount in advance. However, the effective amount for a given situation can be determined by routine experimentation and is within the judgment of the clinician.

For purposes of the present invention, an effective dose will be from about 0.01 mg/ kg to 50 mg/kg or 0.05 mg/kg to about 10 mg/kg of the DNA constructs in the individual to which it is administered.

A pharmaceutical composition can also contain a pharmaceutically acceptable carrier. The term "pharmaceutically acceptable carrier" refers to a carrier for administration of a therapeutic agent, such as antibodies or a polypeptide, genes, and other therapeutic agents. The term refers to any pharmaceutical carrier that does not itself induce the production of antibodies harmful to the individual receiving the composition, and which may be administered without undue toxicity. Suitable carriers may be large, slowly metabolized macromolecules such as proteins, polysaccharides, polylactic acids, polyglycolic acids, polymeric amino acids, amino acid copolymers, and inactive virus particles. Such carriers are well known to those of ordinary skill in the art.

Pharmaceutically acceptable salts can be used therein, for example, mineral acid salts such as hydrochlorides, hydrobromides, phosphates, sulfates, and the like; and the salts of organic acids such as acetates, propionates, malonates, benzoates, and the like. A thorough discussion of pharmaceutically acceptable excipients is available in *Remington's Pharmaceutical Sciences* (Mack Pub. Co., N.J. 1991).

Pharmaceutically acceptable carriers in therapeutic compositions may contain liquids such as water, saline, glycerol and ethanol. Additionally, auxiliary substances, such as wetting or emulsifying agents, pH buffering substances, and the like, may be present in such vehicles. Typically, the therapeutic compositions are prepared as injectables, either as liquid solutions or suspensions; solid forms suitable for solution in, or suspension in, liquid vehicles prior to injection may also be prepared. Liposomes are included within the definition of a pharmaceutically acceptable carrier.

Delivery Methods

Once formulated, the nucleic acid compositions of the invention can be (1) administered directly to the subject; (2) delivered ex vivo, to cells derived from the subject; or (3) delivered in vitro for expression of recombinant proteins.

Direct delivery of the compositions will generally be accomplished by injection, either subcutaneously, intraperitoneally, intravenously or intramuscularly, or delivered to the interstitial space of a tissue. The compositions can also be administered into a tumor or lesion. Other modes of administration include oral and pulmonary administration, suppositories, and transdermal applications, needles, and gene guns or hyposprays. Dosage treatment may be a single dose schedule or a multiple dose schedule.

Methods for the ex vivo delivery and reimplantation of transformed cells into a subject are known in the art and described in e.g., International Publication No. WO 93/14778. Examples of cells useful in ex vivo applications include, for example, stem cells, particularly hematopoetic, lymph cells, macrophages, dendritic cells, or tumor cells.

Generally, delivery of nucleic acids for both ex vivo and in vitro applications can be accomplished by, for example, dextran-mediated transfection, calcium phosphate precipitation, polybrene mediated transfection, protoplast fusion, electroporation, encapsulation of the polynucleotide(s) in liposomes, and direct microinjection of the DNA into nuclei, all well known in the art.

Once a subject gene has been found to correlate with a proliferative disorder, such as neoplasia, dysplasia, and hyperplasia, the disorder may be amenable to treatment by administration of a therapeutic agent based on the nucleic acid or corresponding polypeptide.

Preparation of antisense polypeptides is discussed above. Neoplasias that are treated with the antisense composition include, but are not limited to, cervical cancers, melanomas, colorectal adenocarcinomas, Wilms' tumor, retinoblastoma, sarcomas, myosarcomas, lung carcinomas, leukemias, such as chronic myelogenous leukemia, promyelocytic leukemia, monocytic leukemia, and myeloid leukemia, and lymphomas, such as histiocytic lymphoma. Proliferative disorders that are treated with the therapeutic composition include disorders such as anhydric hereditary

ectodermal dysplasia, congenital alveolar dysplasia, epithelial dysplasia of the cervix, fibrous dysplasia of bone, and mammary dysplasia. Hyperplasias, for example, endometrial, adrenal, breast, prostate, or thyroid hyperplasias or pseudoepitheliomatous hyperplasia of the skin, are treated with antisense therapeutic compositions. Even in disorders in which mutations in the corresponding gene are not implicated, downregulation or inhibition of nucleic acid-related gene expression can have therapeutic application. For example, decreasing nucleic acid-related gene expression can help to suppress tumors in which enhanced expression of the gene is implicated.

Both the dose of the antisense composition and the means of administration are determined based on the specific qualities of the therapeutic composition, the condition, age, and weight of the patient, the progression of the disease, and other relevant factors. Administration of the therapeutic antisense agents of the invention includes local or systemic administration, including injection, oral administration, particle gun or catheterized administration, and topical administration. Preferably, the therapeutic antisense composition contains an expression construct comprising a promoter and a polynucleotide segment of at least about 12, 22, 25, 30, or 35 contiguous nucleotides of the antisense strand of a nucleic acid. Within the expression construct, the polynucleotide segment is located downstream from the promoter, and transcription of the polynucleotide segment initiates at the promoter.

Various methods are used to administer the therapeutic composition directly to a specific site in the body. For example, a small metastatic lesion is located and the therapeutic composition injected several times in several different locations within the body of tumor. Alternatively, arteries which serve a tumor are identified, and the therapeutic composition injected into such an artery, in order to deliver the composition directly into the tumor. A tumor that has a necrotic center is aspirated and the composition injected directly into the now empty center of the tumor. The antisense composition is directly administered to the surface of the tumor, for example, by topical application of the composition. X-ray imaging is used to assist in certain of the above delivery methods.

Receptor-mediated targeted delivery of therapeutic compositions containing an antisense polynucleotide, subgenomic polynucleotides, or antibodies to specific tissues is also used. Receptor-mediated DNA delivery techniques are described in, for

example, Findeis *et al.*, *Trends in Biotechnol.* (1993) *11*:202-205; Chiou *et al.*, (1994) Gene Therapeutics: Methods And Applications Of Direct Gene Transfer (J.A. Wolff, ed.); Wu & Wu, *J. Biol. Chem.* (1988) *263*:621-24; Wu *et al.*, *J. Biol. Chem.* (1994) *269*:542-46; Zenke *et al.*, *Proc. Natl. Acad. Sci. (USA)* (1990) *87*:3655-59; Wu *et al.*, *J. Biol. Chem.* (1991) *266*:338-42. Preferably, receptor-mediated targeted delivery of therapeutic compositions containing antibodies of the invention is used to deliver the antibodies to specific tissue.

Therapeutic compositions containing antisense subgenomic polynucleotides are administered in a range of about 100 ng to about 200 mg of DNA for local administration in a gene therapy protocol. Concentration ranges of about 500 ng to about 50 mg, about 1 mg to about 2 mg, about 5 mg to about 500 mg, and about 20 mg to about 100 mg of DNA can also be used during a gene therapy protocol. Factors such as method of action and efficacy of transformation and expression are considerations which will affect the dosage required for ultimate efficacy of the antisense subgenomic nucleic acids. Where greater expression is desired over a larger area of tissue, larger amounts of antisense subgenomic nucleic acids or the same amounts readministered in a successive protocol of administrations, or several administrations to different adjacent or close tissue portions of, for example, a tumor site, may be required to effect a positive therapeutic outcome. In all cases, routine experimentation in clinical trials will determine specific ranges for optimal therapeutic effect. A more complete description of gene therapy vectors, especially retroviral vectors, is contained in U.S. Serial No. 08/869,309, which is expressly incorporated herein, and in section F below.

For genes encoding polypeptides or proteins with anti-inflammatory activity, suitable use, doses, and administration are described in U.S. Patent No. 5,654,173, incorporated herein by reference. Therapeutic agents also include antibodies to proteins and polypeptides encoded by the subject nucleic acids, as described in U.S. Patent No. 5,654,173.

F. <u>Gene Therapy</u>

The therapeutic nucleic acids of the present invention may be utilized in gene delivery vehicles. The gene delivery vehicle may be of viral or non-viral origin (see generally, Jolly, *Cancer Gene Therapy* (1994) *1*:51-64; Kimura, *Human Gene*

Therpay (1994) *5*:845-852; Connelly, *Human Gene Therapy* (1995) *1*:185-193; and Kaplitt, *Nature Genetics* (1994) *6*:148-153). Gene therapy vehicles for delivery of constructs including a coding sequence of a therapeutic of the invention can be administered either locally or systemically. These constructs can utilize viral or non-viral vector approaches. Expression of such coding sequences can be induced using endogenous mammalian or heterologous promoters. Expression of the coding sequence can be either constitutive or regulated.

The present invention can employ recombinant retroviruses which are constructed to carry or express a selected nucleic acid molecule of interest. Retrovirus vectors that can be employed include those described in EP 0 415 731; WO 90/07936; WO 94/03622; WO 93/25698; WO 93/25234; U.S. Patent No. 5, 219,740; WO 93/11230; WO 93/10218; Vile and Hart, *Cancer Res.* (1993) *53*:3860-3864; Vile and Hart, *Cancer Res.* (1993) *53*:962-967; Ram et al., *Cancer Res.* (1993) *53*:83-88; Takamiya et al., J. *Neurosci. Res.* (1992) *33*:493-503; Baba et al., *J. Neurosurg.* (1993) *79*:729-735; U.S. Patent no. 4,777,127; GB Patent No. 2,200,651; and EP 0 345 242. Preferred recombinant retroviruses include those described in WO 91/02805.

Packaging cell lines suitable for use with the above-described retroviral vector constructs may be readily prepared (see PCT publications WO 95/30763 and WO 92/05266), and used to create producer cell lines (also termed vector cell lines) for the production of recombinant vector particles. Within particularly preferred embodiments of the invention, packaging cell lines are made from human (such as HT1080 cells) or mink parent cell lines, thereby allowing production of recombinant retroviruses that can survive inactivation in human serum.

The present invention also employs alphavirus-based vectors that can function as gene delivery vehicles. Such vectors can be constructed from a wide variety of alphaviruses, including, for example, Sindbis virus vectors, Semliki forest virus (ATCC VR-67; ATCC VR-1247), Ross River virus (ATCC VR-373; ATCC VR-1246) and Venezuelan equine encephalitis virus (ATCC VR-923; ATCC VR-1250; ATCC VR 1249; ATCC VR-532). Representative examples of such vector systems include those described in U.S. Patent Nos. 5,091,309; 5,217,879; and 5,185,440; and PCT Publication Nos. WO 92/10578; WO 94/21792; WO 95/27069; WO 95/27044; and WO 95/07994.

Gene delivery vehicles of the present invention can also employ parvovirus such as adeno-associated virus (AAV) vectors. Representative examples include the AAV vectors disclosed by Srivastava in WO 93/09239, Samulski et al., *J. Vir.* (1989) *63*:3822-3828; Mendelson et al., *Virol.* (1988) *166*:154-165; and Flotte et al., *PNAS* (1993) *90*:10613-10617.

Representative examples of adenoviral vectors include those described by Berkner, *Biotechniques* (1988) *6*:616-627; Rosenfeld et al., *Science* (1991) *252*:431-434; WO 93/19191; Kolls et al., *PNAS* (1994) *91*:215-219; Kass-Eisler et al., *PNAS* (1993) *90*:11498-11502; Guzman et al., *Circulation* (1993) *88*:2838-2848; Guzman et al., *Cir. Res.* (1993) *73*:1202-1207; Zabner et al., *Cell* (1993) *75*:207-216; Li et al., *Hum. Gene Ther.* (1993) *4*:403-409; Cailaud et al., *Eur. J. Neurosci.* (1993) *5*:1287-1291; Vincent et al., *Nat. Genet.* (1993) *5*:130-134; Jaffe et al., *Nat. Genet.* (1992) *1*:372-378; and Levrero et al., *Gene* (1991) *101*:195-202. Exemplary adenoviral gene therapy vectors employable in this invention also include those described in WO 94/12649, WO 93/03769; WO 93/19191; WO 94/28938; WO 95/11984 and WO 95/00655. Administration of DNA linked to killed adenovirus as described in Curiel, *Hum. Gene Ther.* (1992) *3*:147-154 may be employed.

Other gene delivery vehicles and methods may be employed, including polycationic condensed DNA linked or unlinked to killed adenovirus alone, for example Curiel, *Hum. Gene Ther.* (1992) *3*:147-154; ligand linked DNA, for example see Wu, *J. Biol. Chem.* (1989) *264*:16985-16987; eukaryotic cell delivery vehicles cells, for example see U.S. Serial No. 08/240,030, filed May 9, 1994, and U.S. Serial No. 08/404,796; deposition of photopolymerized hydrogel materials; hand-held gene transfer particle gun, as described in U.S. Patent No. 5,149,655; ionizing radiation as described in U.S. Patent No. 5,206,152 and in WO92/11033; nucleic charge neutralization or fusion with cell membranes. Additional approaches are described in Philip, *Mol. Cell Biol.* (1994) *14*:2411-2418, and in Woffendin, *Proc. Natl. Acad. Sci.* (1994) *91*:1581-1585.

Naked DNA may also be employed. Exemplary naked DNA introduction methods are described in WO 90/11092 and U.S. Patent No. 5,580,859. Uptake efficiency may be improved using biodegradable latex beads. DNA coated latex beads are efficiently transported into cells after endocytosis initiation by the beads. The method may be improved further by treatment of the beads to increase

hydrophobicity and thereby facilitate disruption of the endosome and release of the DNA into the cytoplasm. Liposomes that can act as gene delivery vehicles are described in U.S. Patent No. 5,422,120, PCT Nos. WO 95/13796, WO 94/23697, and WO 91/14445, and EP No. 0 524 968.

Further non-viral delivery suitable for use includes mechanical delivery systems such as the approach described in Woffendin *et al., Proc. Natl. Acad. Sci. USA* (1994) *91*(24):11581-11585. Moreover, the coding sequence and the product of expression of such can be delivered through deposition of photopolymerized hydrogel materials. Other conventional methods for gene delivery that can be used for delivery of the coding sequence include, for example, use of hand-held gene transfer particle gun, as described in U.S. Patent No. 5,149,655; use of ionizing radiation for activating transferred gene, as described in U.S. Patent No. 5,206,152 and PCT No. WO 92/11033.

G. Transgenic Animals

One aspect of the present invention relates to transgenic non-human animals having germline and/or somatic cells in which the biological activity of one or more genes are altered by a chromosomally incorporated transgene.

In a preferred embodiments, the transgene encodes a mutant protein, such as dominant negative protein which antagonizes at least a portion of the biological function of a wild-type protein.

Yet another preferred transgenic animal includes a transgene encoding an antisense transcript which, when transcribed from the transgene, hybridizes with a gene or a mRNA transcript thereof, and inhibits expression of the gene.

In one embodiment, the present invention provides a desired non-human animal or an animal (including human) cell which contains a predefined, specific and desired alteration rendering the non-human animal or animal cell predisposed to cancer. Specifically, the invention pertains to a genetically altered non-human animal (most preferably, a mouse), or a cell (either non-human animal or human) in culture, that is defective in at least one of two alleles of a tumor-suppressor gene. The inactivation of at least one of these tumor suppressor alleles results in an animal with a higher susceptibility to tumor induction or other proliferative or differentiative disorders, or disorders marked by aberrant signal transduction, e.g., from a cytokine or

growth factor. A genetically altered mouse of this type is able to serve as a useful model for hereditary cancers and as a test animal for carcinogen studies. The invention additionally pertains to the use of such non-human animals or animal cells, and their progeny in research and medicine.

Furthermore, it is contemplated that cells of the transgenic animals of the present invention can include other transgenes, e.g., which alter the biological activity of a second tumor suppressor gene or an oncogene. For instance, the second transgene can functionally disrupt the biological activity of a second tumor suppressor gene, such as p53, p73, DCC, $p21^{cip1}$, $p27^{kip1}$, Rb, Mad or E2F. Alternatively, the second transgene can cause overexpression or loss of regulation of an oncogene, such as ras, myc, a cdc25 phosphatase, Bcl-2, Bcl-6, a transforming growth factor, neu, int-3, polyoma virus middle T antigen, SV40 large T antigen, a papillomaviral E6 protein, a papillomaviral E7 protein, CDK4, or cyclin D1.

A preferred transgenic non-human animal of the present invention has germline and/or somatic cells in which one or more alleles of a gene are disrupted by a chromosomally incorporated transgene, wherein the transgene includes a marker sequence providing a detectable signal for identifying the presence of the transgene in cells of the transgenic animal, and replaces at least a portion of the gene or is inserted into the gene or disrupts expression of a wild-type protein.

Still another aspect of the present invention relates to methods for generating non-human animals and stem cells having a functionally disrupted endogenous gene. In a preferred embodiment, the method comprises the steps of:

(i) constructing a transgene construct including (a) a recombination region having at least a portion of the gene, which recombination region directs recombination of the transgene with the gene, and (b) a marker sequence which provides a detectable signal for identifying the presence of the transgene in a cell;

(ii) transfering the transgene into stem cells of a non-human animal;

(iii) selecting stem cells having a correctly targeted homologous recombination between the transgene and the gene;

(iv) transfering cells identified in step (iii) into a non-human blastocyst and implanting the resulting chimeric blastocyst into a non-human female; and

(v) collecting offspring harboring an endogenous gene allele having the correctly targeted recombination.

Yet another aspect of the invention provides a method for evaluating the carcinogenic potential of an agent by (i) contacting a transgenic animal of the present invention with a test agent, and (ii) comparing the number of transformed cells in a sample from the treated animal with the number of transformed cells in a sample from an untreated transgenic animal or transgenic animal treated with a control agent. The difference in the number of transformed cells in the treated animal, relative to the number of transformed cells in the absence of treatment with a control agent, indicates the carcinogenic potential of the test compound.

Another aspect of the invention provides a method of evaluating an anti-proliferative activity of a test compound. In preferred embodiments, the method includes contacting a transgenic animal of the present invention, or a sample of cells from such animal, with a test agent, and determining the number of transformed cells in a specimen from the transgenic animal or in the sample of cells. A statistically significant decrease in the number of transformed cells, relative to the number of transformed cells in the absence of the test agent, indicates the test compound is a potential anti-proliferative agent.

The practice of the present invention will employ, unless otherwise indicated, conventional techniques of cell biology, cell culture, molecular biology, transgenic biology, microbiology, recombinant DNA, and immunology, which are within the skill of the art. Such techniques are explained fully in the literature. See, for example, *Molecular Cloning A Laboratory Manual*, 2nd Ed., ed. by Sambrook, Fritsch and Maniatis (Cold Spring Harbor Laboratory Press:1989); *DNA Cloning*, Volumes I and II (D. N. Glover ed., 1985); *Oligonucleotide Synthesis* (M. J. Gait ed., 1984); Mullis *et al.* U.S. Patent No. 4,683,195; *Nucleic Acid Hybridization* (B.D. Hames & S. J. Higgins eds. 1984); *Transcription And Translation* (B. D. Hames & S. J. Higgins eds. 1984); *Culture Of Animal Cells* (R. I. Freshney, Alan R. Liss, Inc., 1987); *Immobilized Cells And Enzymes* (IRL Press, 1986); B. Perbal, *A Practical Guide To Molecular Cloning* (1984); the treatise, *Methods In Enzymology* (Academic Press, Inc., N.Y.); *Gene Transfer Vectors For Mammalian Cells* (J. H. Miller and M. P. Calos eds., 1987, Cold Spring Harbor Laboratory); *Methods In Enzymology*, Vols. 154 and 155 (Wu et al. eds.), *Immunochemical Methods In Cell And Molecular*

Biology (Mayer and Walker, eds., Academic Press, London, 1987); *Handbook Of Experimental Immunology*, Volumes I-IV (D. M. Weir and C. C. Blackwell, eds., 1986); *Manipulating the Mouse Embryo*, (Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1986).

As mentioned above, the sequences described herein are believed to have particular utility in regards to colon cancer. However, they may also be useful with other types of cancers and other disease states.

The present invention will now be illustrated by reference to the following examples which set forth particularly advantageous embodiments. However, it should be noted that these embodiments are illustrative and are not to be construed as restricting the invention in any way.

XI. Examples

A. Identification of differentially expressed sequences.

Description of the Libraries

SEQ ID Nos: 1-544 were derived from libraries designated as DE and PA as described below. The DE library is a normalized, colon cancer specific, subtracted cDNA library. The DE library is specific for sequences expressed in colon cancer [proximal and distal Dukes' B, microsatellite instability negative (MSI-)] but not expressed in normal tissues, including normal colon tissue. The PA library is a normalized, colon specific, subtracted cDNA library. The PA library is specific for sequences expressed in normal colon tissue but not expressed in other normal tissues.

Construction of a colon cancer specific library

A subtracted colon cancer specific library was made by subtracting pooled proximal, stage B, MSI^- and distal, Stage B, MSI^- tumor tissue cDNA against a combination of pooled driver normal cDNA made from colon, peripheral blood leukocytes (PBL), liver, spleen, lung, kidney, heart, small intestine, skeletal muscle, and prostate tissue cDNAs. The following RNA samples were obtained from Origene Technologies, Inc., Rockville, Maryland, and were used to synthesize the pooled driver cDNA: #HT-1015 normal colon total RNA, #HT-1005 liver total RNA, #HT-1004 spleen total RNA, #HT-1009 lung total RNA, #HT-1003 kidney total RNA,

#HT-1006 peripheral blood leukocyte total RNA, #HT-prostate total RNA, #HM-1002 heart muscle poly A+ RNA, #HM-1007 intestine poly A+ RNA, and #HM-1008 skeletal muscle poly A+ RNA. First-strand cDNA was prepared for each using 1 microgram of RNA. A biased pool of first-strand cDNA was prepared containing 50% normal colon first-strand cDNA reaction and 5.56% of each of the remaining tissue first-strand cDNA reactions by volume. Eight individual amplification reactions, each containing 1 microliter of the biased first-strand cDNA reaction pool, were performed for 18 cycles. The double stranded cDNA product from all eight amplification reactions were pooled and purified for subsequent use in subtractive hybridization. The colon cancer specific subtracted library was called DE and individual clones derived from this library were referred to with a number prefixed by DE.

Normalized subtracted DE colon cancer specific and pooled normal human tissue specific cDNA libraries (same as components of driver cDNA above) were generated according published procedures (Daitchenko et al., 1996 PNAS 93:6025-6030, Gurskaya et al., 1996 Analytical Biochemistry 240:90-97) using Clontech Laboratories, Inc., PCR-Select cDNA subtraction kit, PT1117-1. A forty-five fold mass excess of driver cDNA (450 nanograms) was used for each subtraction experiment. Subtractive hybridization of tester with driver cDNAs was performed twice, each time for about 8 -12 hours. Subtracted cancer specific DE cDNA was ligated into the pCR2.1-TOPO plasmid vector (Invitrogen Corporation, Carlsbad CA) and chemically transformed into ultracompetent Epicurian E. coli XL10-Gold cells (Stratagene, La Jolla, CA). A reverse library was also constructed wherein the tester and driver samples were switched; this library was designated as MD.

Construction of a normal colon specific library

This normal colon tissue specific library was made using Clontech Laboratories Inc PCR-Select kit, K1804-1, following instructions from the users manual (PT1117-1).

Four, 100 μl, SMART PCR cDNA amplification reactions for each normal, non-cancerous, patient sample, were performed, starting with 1 μl from their respective first strand cDNA reactions. Each sample was amplified for only 18 cycles using the following PCR conditions; 95 C-10 sec, 68 C 5 min. using a 9600 Perkin

Elmer instrument. The following are Bayer Diagnostic sample identification numbers for the cDNA samples that were amplified: NPB(-) 27347, NPB(-)27859, NPB(-)28147, NPB(-)28162, NDB(-)28800, NDB(-)29243, NDB(-)29244 and NDB(-)42472. These are normal colon tissue samples obtained from the same patients providing the proximal stage B MSI – and distal stage B MSI- cancer samples, which were used to prepare the DE library described above. Equal volumes of the eight normal colon cDNAs were pooled. A subtracted normal colon tissue specific library was made by subtracting the normal colon cDNA pool against a combination of pooled driver normal cDNA made from peripheral blood leukocytes (PBL), liver, spleen, lung, kidney, heart, small intestine, skeletal muscle, and prostate tissue cDNAs. The following are the RNA samples that were used to synthesize the pooled driver cDNA: #HT-1005 liver total RNA, #HT-1004 spleen total RNA, #HT-1009 lung total RNA, #HT-1003 kidney total RNA, #HT-1006 peripheral blood leukocyte total RNA, #HT-prostate total RNA, #HM-1002 heart muscle poly A+ RNA, #HM-1007 intestine poly A+ RNA, and #HM-1008 skeletal muscle poly A+ RNA. First-strand cDNA was prepared for each using 1 microgram of RNA. A pool of first strand cDNA reactions was then made consisting of equal volumes of the nine driver tissue first-strand cDNA reactions. Eight individual amplification reactions, each containing 1 microliter of the first-strand cDNA reaction pool, were performed for 18 cycles. The double stranded cDNA product from all eight amplification reactions was pooled and purified for subsequent use in subtractive hybridization. The normal colon tissue specific subtracted library was called PA and individual clones derived from this library were referred to with a number prefixed by PA.

The normalized subtracted PA normal colon specific cDNA library and a subtracted normal human tissue specific cDNA library, consisting of the human tissues listed above were generated according published procedures (Daitchenko et al., 1996 PNAS 93:6025-6030, Gurskaya et al., 1996 Analytical Biochemistry 240:90-97) using Clontech Laboratories, Inc., PCR-Select cDNA subtraction kit, PT1117-1. Library construction and cloning were carried out as described above for the colon cancer specific library. Out of the 1152 clones that were analyzed for differential expression, approximately 69% were differentially expressed.

Each EST isolated from each of the above libraries represents a sequence from a partial mRNA transcript, since the cDNA used for making the subtracted library

was restricted with *Rsa*I, a four base cutter restriction endonuclease that generates fragments with an average size of about 600 base pairs.

Validation of differential expression in colon cancer

To validate that the differentially expressed sequences found in this library were specific to colon cancer, the clones were screened with cDNAs prepared from a colon cancer specific library, Delaware (DE), and a normal tissue specific library Maryland (MD).

cDNA clones were analyzed for differential expression following the procedure developed by von Stein et al., 1997, Nucleic Acids Research 25(13):2598-2602 and using probes synthesized according to a published method (Jin et al., 1997, Biotechniques 23:1083-1086). Out of the 1248 clones that were analyzed for differential expression approximately 83% were differentially expressed.

Sequencing and analysis of differentially expressed clones

The nucleotide sequence of the inserts from clones shown to be differentially expressed was determined by single-pass sequencing from either the T7 or M13 promoter sites using fluorescently labeled dideoxynucleotides via the Sanger sequencing method. Sequences were analyzed according to methods described in the text (XI., Examples; B. Results of Public Database Search).

Each nucleic acid represents sequence from at least a partial mRNA transcript. The nucleic acids of the invention were assigned a sequence identification number (see attachments). The nucleic acid sequences are provided in the attached Sequence Listing.

An example of an experiment to identify differentially expressed clones is shown in the Figure, "Differential Expression Analysis". The inserts from subtracted clones were amplified, electrophoresed, and blotted on to membranes as described above. The gel was hybridized with RSA1 cut DE and MD cDNA probes as described above.

In the Figure, individual clones are designated by a number at the top of each lane; the blots are aligned so that the same clone is represented in the same vertical lane in both the upper ("Cancer Probe") and lower ("Normal Probe") blot. Lanes labeled "O" indicate clones that are overexpressed, i.e., show a darker, more prominent band in the upper blot ("Cancer Probe") relative to that observed, in the

same lane, in the lower blot ("Normal Probe"). The Lane labeled "U" indicates a clone that is underexpressed, i.e., shows a darker, more prominent band in the lower blot ("Normal Probe") relative to that observed, in the same lane, in the upper blot ("Cancer Probe"). The lane labeled "M", indicates a clone that is marginally overexpressed in cancer and normal cells.

B. Results of Public Databases Searches

The nucleotide sequence of SEQ ID Nos. 1-544 were aligned with individual sequences that were publicly available. Genbank and divisions of GenBank, such as dbEST, CGAP, and Unigene were the primary databases used to perform the sequence similarity searches. The patent database, GENESEQ, was also utilized.

A total of 544 sequences were analyzed. The sequences were first masked to identify vector-derived sequences, which were subsequently removed. The remaining sequence information was used to create the Sequence Listing (SEQ ID Nos. 1-544). Each of these sequences was used as the query sequence to perform a Blast 2 search against the databases listed above. The Blast 2 search differs from the traditional Blast search in that it allows for the introduction of gaps in order to produce an optimal alignment of two sequences.

A proprietary algorithm was developed to utilize the output from the Blast 2 searches and categorize the sequences based upon high similarity (e value < 1e-40) or identity to entries contained in the GenBank and dbEST databases. Three categories were created as follows: 1) matches to known human genes, 2) matches to human EST sequences, and 3) no significant match to either 1 or 2, and therefore a potentially novel human sequence.

Those skilled in the art will recognize, or be able to ascertain, using not more than routine experimentation, many equivalents to the specific embodiments of the invention described herein. Such specific embodiments and equivalents are intended to be encompassed by the following claims.

All patents, published patent applications, and publications cited herein are incorporated by reference as if set forth fully herein.

TABLE 1

SEQ ID NO	clone name	Tissue Probe	SEQ ID NO	clone name	Tissue Probe
1	de0020t7	U	53	de0079t7	N
2	de0041t7	N	54	de0085t7	N
3	de0056t7	U	55	de0089t7	N
4	de0064t7	N	56	de0095t7	N
5	de0092t7	U	57	de0099t7	N
6	de0142t7	N	58	de0105t7	N
7	de0153t7	M	59	de0112t7	N
8	de0163t7	U	60	de0114t7	N
9	de0188t7	N	61	de0121t7	N
10	de0190t7	U	62	de0122t7	N
11	de0201t7	M	63	de0124t7	N
12	de0225t7	U	64	de0139t7	M
13	de0246t7	U	65	de0143t7	N
14	de0257t7	N	66	de0166t7	U
15	de0285t7	O	67	de0168t7	N
16	de0529t7	U	68	de0171t7	N
17	de0629t7	U	69	de0178t7	N
18	de0727t7	O	70	de0180t7	O
19	de0787t7	U	71	de0181t7	N
20	de0810t7	N	72	de0199t7	N
21	de0833t7	N	73	de0200t7	N
22	pa0107t7	U	74	de0202t7	N
23	pa0130t7	U	75	de0205t7	N
24	pa0149t7	U	76	de0207t7	U
25	pa0185t7	U	77	de0212t7	N
26	pa0203t7	U	78	de0217t7	N
27	pa0277t7	U	79	de0220t7	U
28	pa0287t7	U	80	de0228t7	N
29	pa0293t7*	U	81	de0236t7	O
30	pa0341t7	U	82	de0243t7	N
31	pa0357t7	N	83	de0253t7	O
32	pa0361t7	U	84	de0258t7	N
33	pa0404t7	U	85	de0259t7	N
34	pa0408t7	U	86	de0262t7	N
35	pa0425t7	N	87	de0270t7	N
36	de0001t7	N	88	de0275t7	N
37	de0002t7	N	89	de0287t7	N
38	de0036t7	N	90	de0288t7	N
39	de0038t7	M	91	de0306t7	N
40	de0040t7	N	92	de0490t7	N
41	de0043t7	O	93	de0501t7	M
42	de0044t7	N	94	de0516t7	N
43	de0045t7	N	95	de0589t7	N
44	de0050t7	N	96	de0596t7	U
45	de0052t7	N	97	de0600t7	N
46	de0054t7	N	98	de0609t7	U
47	de0055t7	N	99	de0611t7	N
48	de0059t7	O	100	de0617t7	U
49	de0060t7	N	101	de0633t7	N
50	de0063t7	U	102	de0643t7	N
51	de0066t7	O	103	de0647t7	M
52	de0067t7	O	104	de0652t7	N

105	de0666t7	N	161	pa0405t7	N
106	de0695t7	U	162	pa0406t7	N
107	de0705t7	N	163	pa0409t7	U
108	de0706t7	M	164	pa0411t7	N
109	de0708t7	N	165	pa0417t7	N
110	de0724t7	N	166	pa0421t7	U
111	de0735t7	N	167	pa0429t7	U
112	de0740t7	N	168	pa0432t7	U
113	de0742t7	N	169	de0004t7	U
114	de0747t7	N	170	de0008t7	ND
115	de0764t7	N	171	de0009t7	ND
116	de0777t7	O	172	de0010t7	ND
117	de0781t7	N	173	de0011t7	ND
118	de0793t7	U	174	de0012t7	ND
119	de0794t7	N	175	de0013t7	ND
120	de0798t7	N	176	de0014t7	ND
121	de0800t7	O	177	de0016t7	ND
122	de0816t7	N	178	de0017t7	ND
123	de0818t7	N	179	de0018t7	M
124	de0835t7	N	180	de0019t7	ND
125	pa0078t7	U	181	de0023t7	O
126	pa0080t7	N	182	de0024t7	N
127	pa0088t7	U	183	de0029t7	ND
128	pa0089t7	U	184	de0030t7	ND
129	pa0095t7	U	185	de0032t7	ND
130	pa0158t7	U	186	de0033t7	O
131	pa0159t7	U	187	de0034t7	ND
132	pa0187t7	N	188	de0035t7	ND
133	pa0190t7	U	189	de0042t7	ND
134	pa0192t7	U	190	de0047t7	ND
135	pa0209t7	U	191	de0048t7	N
136	pa0215t7	N	192	de0049t7	ND
137	pa0218t7	N	193	de0051t7	O
138	pa0220t7	N	194	de0053t7	ND
139	pa0238t7	N	195	de0065t7	ND
140	pa0249t7	U	196	de0068t7	N
141	pa0256t7	N	197	de0069t7	ND
142	pa0258t7	U	198	de0071t7	N
143	pa0272t7	N	199	de0072t7	ND
144	pa0283t7	N	200	de0076t7	U
145	pa0295t7	N	201	de0077t7	ND
146	pa0309t7	U	202	de0078t7	ND
147	pa0314t7	N	203	de0080t7	ND
148	pa0317t7	N	204	de0082t7	ND
149	pa0319t7	N	205	de0086t7	ND
150	pa0323t7	N	206	de0087t7	ND
151	pa0333t7	N	207	de0088t7	ND
152	pa0336t7	N	208	de0093t7	N
153	pa0353t7	N	209	de0094t7	ND
154	pa0363t7	N	210	de0097t7	O
155	pa0364t7	N	211	de0098t7	ND
156	pa0366t7	U	212	de0100t7	ND
157	pa0382t7	N	213	de0101t7	ND
158	pa0383t7	N	214	de0102t7	ND
159	pa0388t7	N	215	de0106t7	ND
160	pa0389t7	N	216	de0109t7	U

217	de0110t7	N	273	de0214t7	ND
218	de0111t7	N	274	de0215t7	ND
219	de0113t7	ND	275	de0218t7	ND
220	de0115t7	O	276	de0221t7	ND
221	de0117t7	ND	277	de0223t7	O
222	de0118t7	U	278	de0227t7	ND
223	de0119t7	ND	279	de0229t7	O
224	de0123t7	ND	280	de0230t7	ND
225	de0125t7	ND	281	de0232t7	ND
226	de0126t7	ND	282	de0234t7	ND
227	de0129t7	ND	283	de0235t7	ND
228	de0130t7	U	284	de0237t7	ND
229	de0131t7	O	285	de0238t7	ND
230	de0132t7	ND	286	de0239t7	N
231	de0134t7	O	287	de0241t7	N
232	de0135t7	ND	288	de0242t7	O
233	de0137t7	M	289	de0244t7	N
234	de0138t7	ND	290	de0247t7	O
235	de0140t7	ND	291	de0252t7	ND
236	de0141t7	ND	292	de0255t7	N
237	de0145t7	ND	293	de0256t7	ND
238	de0146t7	O	294	de0260t7	N
239	de0148t7	ND	295	de0261t7	N
240	de0149t7	ND	296	de0263t7	N
241	de0151t7	O	297	de0264t7	ND
242	de0152t7	ND	298	de0265t7	ND
243	de0154t7	ND	299	de0266t7	O
244	de0156t7	ND	300	de0267t7	N
245	de0157t7	U	301	de0268t7	ND
246	de0158t7	ND	302	de0272t7	ND
247	de0159t7	N	303	de0273t7	ND
248	de0162t7	ND	304	de0274t7	N
249	de0169t7	U	305	de0276t7	O
250	de0170t7	O	306	de0277t7	M
251	de0174t7	ND	307	de0279t7	N
252	de0176t7	ND	308	de0280t7	ND
253	de0177t7	O	309	de0281t7	N
254	de0182t7	ND	310	de0282t7	ND
255	de0183t7	ND	311	de0284t7	ND
256	de0184t7	ND	312	de0286t7	ND
257	de0186t7	ND	313	de0339t7	ND
258	de0187t7	M	314	de0483t7	ND
259	de0189t7	ND	315	de0484t7	M
260	de0191t7	M	316	de0491t7	ND
261	de0192t7	ND	317	de0499t7	ND
262	de0193t7	ND	318	de0507t7	M
263	de0195t7	N	319	de0511t7	O
264	de0196t7	N	320	de0519t7	ND
265	de0197t7	N	321	de0520t7	N
266	de0198t7	ND	322	de0522t7	ND
267	de0203t7	ND	323	de0524t7	M
268	de0208t7	ND	324	de0530t7	ND
269	de0209t7	N	325	de0531t7	ND
270	de0210t7	N	326	de0532t7	M
271	de0211t7	ND	327	de0534t7	N
272	de0213t7	ND	328	de0542t7	ND

329	de0556t7	M	385	de0707t7	O
330	de0557t7	ND	386	de0709t7	O
331	de0559t7	U	387	de0710t7	ND
332	de0562t7	ND	388	de0712t7	N
333	de0566t7	U	389	de0715t7	ND
334	de0567t7	N	390	de0719t7	N
335	de0568t7	ND	391	de0722t7	ND
336	de0570t7	ND	392	de0723t7	ND
337	de0571t7	ND	393	de0725t7	N
338	de0574t7	ND	394	de0728t7	ND
339	de0581t7	ND	395	de0729t7	ND
340	de0583t7	U	396	de0731t7	ND
341	de0587t7	ND	397	de0732t7	ND
342	de0588t7	ND	398	de0737t7	ND
343	de0591t7	ND	399	de0739t7	M
344	de0592t7	ND	400	de0741t7	ND
345	de0597t7	U	401	de0744t7	N
346	de0598t7	ND	402	de0746t7	ND
347	de0599t7	ND	403	de0749t7	N
348	de0602t7	N	404	de0750t7	ND
349	de0605t7	ND	405	de0756t7	ND
350	de0608t7	ND	406	de0759t7	ND
351	de0610t7	ND	407	de0761t7	O
352	de0616t7	O	408	de0762t7	ND
353	de0619t7	U	409	de0766t7	ND
354	de0620t7	ND	410	de0768t7	U
355	de0622t7	ND	411	de0769t7	ND
356	de0623t7	ND	412	de0772t7	ND
357	de0624t7	O	413	de0776t7	ND
358	de0625t7	ND	414	de0779t7	ND
359	de0628t7	ND	415	de0785t7	ND
360	de0630t7	ND	416	de0786t7	ND
361	de0631t7	ND	417	de0788t7	ND
362	de0632t7	N	418	de0789t7	ND
363	de0634t7	ND	419	de0792t7	ND
364	de0639t7	ND	420	de0796t7	ND
365	de0642t7	ND	421	de0797t7	ND
366	de0649t7	ND	422	de0801t7	O
367	de0650t7	N	423	de0804t7	ND
368	de0656t7	N	424	de0805t7	ND
369	de0657t7	ND	425	de0806t7	ND
370	de0660t7	ND	426	de0807t7	N
371	de0661t7	O	427	de0811t7	O
372	de0662t7	O	428	de0812t7	ND
373	de0664t7	ND	429	de0817t7	N
374	de0665t7	ND	430	de0820t7	ND
375	de0667t7	ND	431	de0821t7	ND
376	de0669t7	ND	432	de0822t7	ND
377	de0676t7	ND	433	de0823t7	N
378	de0686t7	N	434	de0824t7	N
379	de0687t7	ND	435	de0825t7	ND
380	de0689t7	N	436	de0826t7	ND
381	de0691t7	M	437	de0827t7	ND
382	de0693t7	ND	438	de0829t7	ND
383	de0703t7	ND	439	de0830t7	ND
384	de0704t7	M	440	de0837t7	N

441	de0840t7	ND
442	de0848t7	ND
443	pa0079t7	N
444	pa0081t7	ND
445	pa0082t7	ND
446	pa0083t7	ND
447	pa0084t7	ND
448	pa0085t7	ND
449	pa0086t7	M
450	pa0090t7	N
451	pa0091t7	ND
452	pa0092t7	N
453	pa0096t7	ND
454	pa0100t7	ND
455	pa0101t7	U
456	pa0103t7	ND
457	pa0104t7	ND
458	pa0114t7	ND
459	pa0115t7	ND
460	pa0118t7	ND
461	pa0120t7	ND
462	pa0129t7	ND
463	pa0131t7	U
464	pa0133t7	ND
465	pa0135t7	N
466	pa0140t7	O
467	pa0142t7	ND
468	pa0143t7	ND
469	pa0146t7	ND
470	pa0147t7	ND
471	pa0148t7	ND
472	pa0151t7	ND
473	pa0157t7	ND
474	pa0164t7	ND
475	pa0167t7	N
476	pa0171t7	U
477	pa0174t7	ND
478	pa0175t7	ND
479	pa0179t7	N
480	pa0182t7	ND
481	pa0184t7	ND
482	pa0186t7	U
483	pa0189t7	ND
484	pa0207t7	ND
485	pa0210t7	ND
486	pa0212t7	ND
487	pa0214t7	ND
488	pa0216t7	ND
489	pa0217t7	M
490	pa0219t7	N
491	pa0223t7	ND
492	pa0224t7	ND
493	pa0228t7	ND
494	pa0229t7	U
495	pa0231t7	ND
496	pa0232t7	ND
497	pa0240t7	ND
498	pa0252t7	ND
499	pa0260t7	U
500	pa0261t7	N
501	pa0262t7	ND
502	pa0264t7	N
503	pa0265t7	N
504	pa0268t7	ND
505	pa0276t7	ND
506	pa0279t7	ND
507	pa0280t7	ND
508	pa0282t7	ND
509	pa0285t7	ND
510	pa0299t7	ND
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521	pa0325t7	N
522	pa0326t7	ND
523	pa0332t7	ND
524	pa0339t7	ND
525	pa0346t7	O
526	pa0349t7	ND
527	pa0351t7	U
528	pa0355t7	ND
529	pa0358t7	ND
530	pa0360t7	N
531	pa0362t7	ND
532	pa0368t7	U
533	pa0369t7	ND
534	pa0373t7	ND
535	pa0380t7	ND
536	pa0393t7	ND
537	pa0395t7	ND
538	pa0396t7	ND
539	pa0397t7	ND
540	pa0410t7	N
541	pa0415t7	ND
542	pa0416t7	ND
543	pa0424t7	ND
544	pa0430t7	ND

* In the provisional application (60/098,639) filed August 31, 1998, clone PA0293t7 was labeled clone PA0023t7 in error. That mistake has been corrected here to reflect the accurate clone name.

Table 2

SEQ ID NO	Clone name	"Novel" Region 1 Start / Stop	"Novel" Region 2 Start / Stop	GenBank Identifier for top 5 matching EST sequences				
36.00	de0001t7	439-607		g835668	g857149	g1321047	g1968601	g1476832
40.00	de0040t7	1-201		g2166831	g4136486	g1747976	g1180529	g2265195
41.00	de0043t7	467-615		g5129477	g1801229	g1845053	g1544683	g1694347
43.00	de0045t7	1-228		g2322205	g1139955	g4267203	g2165927	g3039227
45.00	de0052t7	455-628		g1523492	g1548890	g1523465	g1809433	g5132985
50.00	de0063t7	1-114	452-624	g2197338	g5754794	g2694448	g2070840	g3419233
51.00	de0066t7	301-631		g2162184	g749398	g1239250	g839454	g1966148
52.00	de0067t7	391-623		g1521548	g848102	g1349419	g1196287	g771178
54.00	de0085t7	415-565		g1367045	g1367136	g2337716	g841637	g795336
63.00	de0124t7	411-605		g1809451	g1757444	g3181138	g2905518	g1157799
64.00	de0139t7	424-612		g3899105	g3431615	g3246439	g1312989	g1182375
65.00	de0143t7	479-598		g1239204	g1067288	g1080541	g4876470	g1188553
68.00	de0171t7	443-611		g867521	g1636718	g2162333	g2342197	g1466482
69.00	de0178t7	485-603		g1371240	g2055704	g2208007	g1686872	g1740908
71.00	de0181t7	1-153		g1188057	g1018287	g1447796	g1025264	g1069169
73.00	de0200t7	1-218	384-581	g1972267	g1989383	g964966	g2883986	g483738
74.00	de0202t7	448-599		g2115372	g1959491	g1329334	g1198642	g1957432
75.00	de0205t7	1 to 75		g779809	g2167738	g2537620	g2656428	
77.00	de0212t7	1-185		g4265939	g1548503	g1687914	g1716864	g877386
80.00	de0228t7	411-594		g3446139	g3745043	g1126367	g2163321	g1195781
82.00	de0243t7	253-604		g2001999	g1071313	g966668	g26974	
83.00	de0253t7	1-133		g2111781	g1663818	g574791	g1406232	g1663812
85.00	de0259t7	241-602		g2216159	g5177204	g1969363	g1388290	g1389464
86.00	de0262t7	351-583		g1025700	g2019225	g2080424	g1547366	g728148
88.00	de0275t7	455-592		g5665082	g5553136	g5552975	g389141	g1665092
89.00	de0287t7	364-630		g2026446	g4622337	g2021046	g2056125	g5037418
92.00	de0490t7	1-264	482-653	g1812285	g2816130	g2818085	g2819140	g1194260
96.00	de0596t7	362-655		g1155862	g1991972	g1996949	g1149020	g3307331
97.00	de0600t7	1 to 71		g883470	g1880085	g3162627	g3162628	g918039
98.00	de0609t7	434-582		g5037002	g1404408	g2816378	g759987	g2969638
102.00	de0643t7	433-605		g1382697	g5236495	g5235876	g5177792	g4453929

105.00	de0666t7	385-586		g2932996	g1010052	g2616680	g3277252	g2252166
106.00	de0695t7	401-644		g4897106	g1741190	g1501550	g3932286	g781364
107.00	de0705t7	431-599		g5176918	g1551249	g4739742	g2540062	g2583382
108.00	de0706t7	407-620		g826820	g870098	g1685556	g1687983	g685342
110.00	de0724t7	127-192	423-603	g2036407	g1969842	g616903	g1218717	g1745366
113.00	de0742t7	1 to 49		g2596046	g3277962	g4665052	g895453	g1521473
116.00	de0777t7	270-610		g2358992	g1692100	g1979572	g1720777	g1547963
117.00	de0781t7	457-608		g1982258	g1379170	g1496197	g1981084	g1982434
118.00	de0793t7	435-577		g1860678	g1991856	g946392	g4703537	g5741112
119.00	de0794t7	342-584		g4394682	g3418148	g3424422	g1398292	g4985474
120.00	de0798t7	1 to 65	384-585	g1570282	g4817443	g3891031	g2028723	g2357411
121.00	de0800t7	270-568		g2358992	g1692100	g1979572	g1720777	g1692006
122.00	de0816t7	485-550		g2014274	g2189652	g1087845	g2013302	g643722
123.00	de0818t7	387-573		g4190027	g4900502	g3601481	g4070577	g4112474
124.00	de0835t7	330-570		g2029304	g2029457	g1544689	g1947895	g2986865
129.00	pa0095t7	1-370		g5340876	g771049	g791906	g677786	
132.00	pa0187t7	388-593		g2029457	g2029304	g1544689	g1947895	g2986865
134.00	pa0192t7	444-618		g4897608	g1815096	g2051120	g3426889	g4690585
139.00	pa0238t7	364-586		g4728995	g4971678	g1615267	g1501282	g5447095
140.00	pa0249t7	124-588		g2061363	g2060961	g2060863	g1135265	g2060372
142.00	pa0258t7	254-595		g2784639	g2276958	g968701	g1670101	g2329615
143.00	pa0272t7	1 to 98		g2198976	g1961065	g2188645	g1965162	g1852287
148.00	pa0317t7	457-612		g5113829	g2080750	g3739118	g3753615	g2933157
153.00	pa0353t7	357-620		g2029457	g2029304	g2986865	g1544689	g1947895
156.00	pa0366t7	354-760		g5339118	g775873	g610250	g3886660	g2052048
157.00	pa0382t7	395-668		g3886319	g968094	g2216376	g4126052	g1747689
159.00	pa0388t7	492-739		g1636721	g2006249	g5035641	g3430502	g778670
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TABLE 3

The following list of clones indicates those found in either the DE or PA libraries and the SW480 library

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193	de0051t7
196	de0068t7
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375	de0667t7
379	de0687t7
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410	de0768t7
427	de0811t7
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481	pa0184t7
493	pa0228t7
494	pa0229t7
140	pa0249t7
506	pa0279t7
510	pa0299t7
515	pa0306t7
517	pa0311t7
518	pa0316t7
536	pa0393t7
539	pa0397t7
544	pa0430t7

We claim:

1. An isolated nucleic acid comprising a nucleotide sequence which hybridizes under stringent conditions to a sequence of SEQ ID Nos. 1-35 or a sequence complementary thereto.

2. An isolated nucleic acid comprising a nucleotide sequence at least 80% identical to a sequence corresponding to at least about 15 consecutive nucleotides of one of SEQ ID Nos. 1-35 or a sequence complementary thereto.

3. An isolated nucleic acid comprising a nucleotide sequence of SEQ ID Nos. 1-35 or a sequence complementary thereto.

4. A nucleic acid according to claim 1, further comprising a transcriptional regulatory sequence operably linked to said nucleotide sequence so as to render said nucleotide sequence suitable for use as an expression vector.

5. An expression vector, capable of replicating in at least one of a prokaryotic cell and eukaryotic cell, comprising the nucleic acid of claim 4.

6. A host cell transfected with the expression vector of claim 5.

7. A transgenic animal having a transgene of the nucleic acid of claim 1 incorporated in cells thereof, which transgene modifies the level of expression of the nucleic acid, the stability of an mRNA transcript of the nucleic acid, or the activity of the encoded product of the nucleic acid.

8. A substantially pure nucleic acid which hybridizes under stringent conditions to a nucleic acid probe corresponding to at least 12 consecutive nucleotides of one of SEQ ID Nos. 1-168 or a sequence complementary thereto.

9. A polypeptide including an amino acid sequence encoded by a nucleic acid of claim 1 or a fragment comprising at least 25 amino acids thereof.

10. A probe/primer comprising a substantially purified oligonucleotide, said oligonucleotide containing a region of nucleotide sequence which hybridizes under stringent conditions to at least 12 consecutive nucleotides of sense or antisense sequence selected from SEQ ID Nos. 1-168.

11. An array including at least 10 different probes of claim 10 attached to a solid support.

12. The probe/primer of claim 10, further comprising a label group attached thereto and able to be detected.

13. The probe/primer of claim 12, wherein said label group being selected from radioisotopes, fluorescent compounds, enzymes, and enzyme co-factors.

14. An antibody immunoreactive with a polypeptide of claim 9.

15. An antisense oligonucleotide analog which hybridizes under stringent conditions to at least 12 consecutive nucleotides of one of SEQ ID Nos. 1-35 or a sequence complementary thereto, and which is resistant to cleavage by a nuclease.

16. A test kit for determining the phenotype of transformed cells, comprising the probe/primer of claim 12, for measuring a level of a nucleic acid which hybridizes under stringent conditions to a nucleic acid of SEQ ID Nos. 1-544 in a sample of cells isolated from a patient.

17. A test kit for determining the phenotype of transformed cells, comprising an antibody specific for a protein encoded by a nucleic acid which hybridizes under stringent conditions to any one of SEQ Nos. 1-544.

18. A method of determining the phenotype of a cell, comprising detecting the differential expression, relative to a normal cell, of at least one nucleic acid

which hybridizes under stringent conditions to one of SEQ ID Nos. 1-544, wherein the nucleic acid is differentially expressed by at least a factor of two.

19. A method for determining the phenotype of cells in a sample of cells from a patient, comprising:

i. providing a nucleic acid probe comprising a nucleotide sequence having at least 12 consecutive nucleotides of any of SEQ ID Nos. 1-544;

ii. obtaining a sample of cells from a patient;

iii. providing a second sample of cells substantially all of which are non-cancerous;

iv. contacting the nucleic acid probe under stringent conditions with mRNA of each of said first and second cell samples; and

v. comparing (a) the amount of hybridization of the probe with mRNA of the first cell sample, with (b) the amount of hybridization of the probe with mRNA of the second cell sample, wherein a difference of at least a factor of two in the amount of hybridization with the mRNA of the first cell sample as compared to the amount of hybridization with the mRNA of the second cell sample is indicative of the phenotype of cells in the first cell sample.

20. A method of determining the phenotype of a cell, comprising detecting the differential expression, relative to a normal cell, of at least one protein encoded by a nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-544, wherein the protein is differentially expressed by at least a factor of two.

21. The method of claim 20, wherein the level of said protein is detected in an immunoassay.

22. A method for determining the presence or absence of a nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-168 in a cell, comprising contacting the cell with a probe of claim 10.

23. A method for determining the presence of absence of a polypeptide encoded by a nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-35 in a cell, comprising contacting the cell with an antibody of claim 14.

24. A method for detecting a mutation in a test nucleic acid which hybridizes under stringent conditions to a nucleic acid of SEQ ID Nos. 1-544 or a sequence complementary thereto, comprising

i. collecting a sample of cells from a patient,

ii. isolating nucleic acid from the cells of the sample,

iii. contacting the nucleic acid sample with one or more primers which specifically hybridize to a nucleic acid sequence of SEQ ID Nos. 1-544 under conditions such that hybridization and amplification of the nucleic acid occurs, and

iv. comparing the presence, absence, or size of an amplification product to the amplification product of a normal cell.

25. A method for identifying an agent which alters the level of expression in a cell of a nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-544 or a sequence complementary thereto, comprising

i. providing a cell;

ii. treating the cell with a test agent;

iii. determining the level of expression in the cell of a nucleic acid which hybridizes under stringent conditions to one of SEQ ID Nos. 1-544 or a sequence complementary thereto; and

iv. comparing the level of expression of the nucleic acid in the treated cell with the level of expression of the nucleic acid in an untreated cell, wherein a change in the level of expression of the nucleic acid in the treated cell relative to the level of expression of the nucleic acid in the untreated cell is indicative of an agent which alters the level of expression of the nucleic acid in a cell.

26. A pharmaceutical composition comprising an agent identified by the method of claim 25.

27. A pharmaceutical composition comprising a nucleic acid which includes a nucleotide sequence which hybridizes under stringent conditions to one of SEQ ID Nos. 1-544 or a sequence complementary thereto.

28. A pharmaceutical composition comprising a polypeptide encoded by a nucleic acid which includes a nucleotide sequence that hybridizes under stringent conditions to one of SEQ ID Nos. 1-544 or a sequence complementary thereto.

29. An isolated nucleic acid comprising a portion of a nucleotide sequence of SEQ ID Nos. 36-168 or a sequence complementary thereto.

30. A gene which hybridizes to one of SEQ ID Nos. 1-35.

31. A method for detecting cancer in which one or more of SEQ ID Nos. 1-544 are used as probes, said method comprising:

i. collecting a sample of cells from a patient,

ii. isolating nucleic acid from the cells of the sample,

iii. contacting the nucleic acid sample with one or more primers which specifically hybridize to a nucleic acid sequence of SEQ ID Nos. 1-544 under conditions such that hybridization and amplification of the nucleic acid occurs, and

iv. comparing the presence, absence, or size of an amplification product to the amplification product of a normal cell.

32. A method of claim 31 in which said cancer is colon cancer.

33. A method for detecting cancer in a patient sample in which an antibody to a protein encoded by SEQ ID Nos. 1-544 is used to react with proteins in said sample.

34. A method of claim 33 in which said cancer is colon cancer.

Differential Expression Analysis

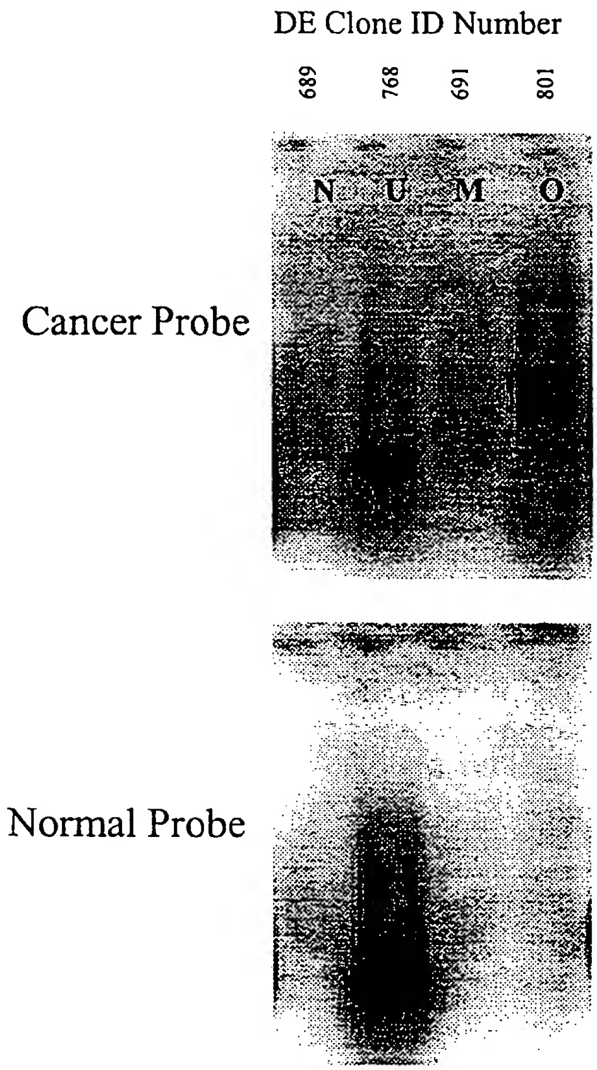

Fig. 1

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cattattatt aatcgttctt aaattaaatg cagggccaag catgctgcac gtggaatctg    240
gacaattttt tgataaactt taaggctgct aaataattta cagaaactgt gaatgcattt    300
tcattttacg aggcaaaaga gaaaatattc aagattgcat agcaatttta ttttttgaaa    360
```

tggttatcct aaagaatttc cttaaattca gattttgcaa aattcctact ctncaagtca 420
tcaagtgaac actaaaagca actttctcgt gaatcagtgg acttttacga ggcatgcatt 480
tttcataaat ctaggccaag tgacctaatt gngattaaat cttaatcatc ctgngattct 540
ggctattaan atgggtttaa ancngtaaaa atnctttnaa aaagccgtta cttnccgan 599

<210> 15
<211> 457
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(457)
<223> n = A,T,C or G

<400> 15
ggtacttttt tttttttttt tttttttttc gaaatgaaca aatatttatt tatcttttat 60
aacaagtaag gcaatgttgc ttaaaggaag acaaacaaac ataaaagatt ccgttgacaa 120
tgcatttttt catntgttcg gcacaatgct tttgtcataa tggagatgtg acagcaaact 180
ttccaggaca ttcagtcttc ggnggcagca cttagggcan atgactggcc gctcaaattc 240
tctatnttgt ttcaggacag tggaaaagct tatanatgag gccaaagcac caggtaggtg 300
gaaggttctt gtatcggttc gaacccccgac agcgcgccaa cagacaacac naggcagtgg 360
ggagcaacat gctgttttaa tgancgcctg ggtgcangcg tgctgaggct gaaaatggca 420
taaccccccgc gtcctgccng gcgggcgttc aaanggn 457

<210> 16
<211> 643
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(643)
<223> n = A,T,C or G

<400> 16
ggtacaatct agctgaaatc atatacaagt aagtaggtgt ggacttttac tgctgagcta 60
aagtttatgt ttatatatgt tttattcttt aagctaaaca aacattcaga taacattcta 120
tgcatttttt gaagcatagg gttagtaatg aggacttaga ttttttaatt aaacaattca 180
gtaactatat aaaaagaaaa ggagtccctt atgaataaat attaaaatta aaagaaatag 240
gcaactataa aagtaagtat ttttaataat ggcattgatt ttagtaagaa atcaattagg 300
ctgggctgga aagaaaaact ggcttaatat aaagtagttt taatatggca aatattcttc 360
ttaaaattgn ggccctggaa tatcatttct gcctattgct gatgctaagg natcaactgn 420
gccaagtatt gggctgntcc acaggtggga angagtagca acatttgng gattttttt 480
tttttttaaa accggagaat acccggccag gggntcaagn ctgnatccac antttgggag 540
nttagccgga naancccttgg anccggagna aaggttnaan gagncaaaat gngccatggn 600
ttccanctgg ggacccgggg gnaactcttt taaaccnaaa aat 643

<210> 17
<211> 336
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(336)
<223> n = A,T,C or G

<400> 17
ggtactttga taaatgtaga aagattattt aattctggct tggtaccgtg gctcatgcct 60
ataatcccag cacttcagga ggctgaggtg ggtggatcac ttgagctcag gagtttgaga 120
ccaggcgaaa ccctgtctcc acaaaaaatg caaaaattgc tggacatggt ggcacatgcc 180
tgtagtccca gctacttgga aggctgaggc aggaggatag cttgagccca ggaggtcaag 240
gttgcagtga gccgagattg tgccactgca ctccagcctg ggcaacagag caagaccctg 300
cctcaaattt aaaaaaaaaa aannaaaaaa aaaagt 336

<210> 18
<211> 614
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(614)
<223> n = A,T,C or G

<400> 18
ggtacactct tcttcgcctt tgagtgccgc tacctggctg ttcagctgtc tcctgccatc 60
cctgtatttg ctgccatgct cttccttttc tccatggcta cactgttgag gaccagtttc 120
agtgaccctg gagtgattcc tcgggcgcta ccagatgaag cagctttcat agaaatggag 180
atagaagcta ccaatggtgc ggtgccccag ggccagcgac caccgcctcg tatcaagaat 240
ttccagataa acaaccagat tgtgaaactg aaatactgtt acacatgcaa gatcttccgg 300
cctcccgggc ctccattgca gcatctgtga caactgtgtg gagcgcttcg accatcactg 360
cccctgggta gggaaatgtg ttggaaaaga ggaactaccg ntacttctac ctcttcatcc 420
tttctctttt ccctccttac aaactaaggc tttngctttc aacatcgcta tgtgggccct 480
aaaatctttg aaaattggct ttttggaana cattgaaaga aactcctgga aactggtcta 540
gaaagnccta attgcttctt tacactttgg nccnncnggg actgatggga tttcanactt 600
tcttgggact ttna 614

<210> 19
<211> 296
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(296)
<223> n = A,T,C or G

<400> 19
actttttttt tttttttttt ttttttttgg gatggagtct cactntgttg ccaaggctgg 60
agtgcagtgg cataatttcg gctcacttca acctctgcct cccgggttca agcaattctg 120
cgtcagcctc cggaggagct aggactacag gcatgcacca ccatgcccaa ctaattttg 180
nattttttagt agagatggag tttcaccata ttgaccaggc taggctggtc ttgaactcct 240
agcctnaggt gatctgccca cctnagcccc ccaaagtacc tcggccgtga ccacgc 296

<210> 20
<211> 565
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(565)
<223> n = A,T,C or G

<400> 20
```
accaattata atgcattatt atgaaatatt taaaatgggg aatccaagat gacatagttt     60
ttaactcatc cacatactgg aagtttagag aaactcagaa tttcttattt ctttttcttt    120
ttcctccata gcataaaagc tttgctaata agaataaata tatatattgg agttttagtg    180
tttgatcctg tgatcagttg taaccatgtg tcataaaact ctctcacaga ttccatcttt    240
cccaaatctt ctgatcataa cacagattgc catatagact tcccttgtaa ggagaatatg    300
ctggccataa ggcaagcana agtgaacttg cagtttcact tcttggaaat taatgcattt    360
gcattgactt ctataannta atctctcctg aatttttttg cttagtcaac ttactgtgtg    420
caaagncaac agnaaattgt ctttggttna acttttaaca ggncaattta taaattggtt    480
tgaagaagcn tcccnaaatt ttttattgaa ggctgaattc aagcctccnt taaaatggnc    540
atngnataan gggaatttat tgtng                                          565
```

<210> 21
<211> 582
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(582)
<223> n = A,T,C or G

<400> 21
```
ggtactggaa caactataag acccctgttc agattaagga atttggcgca gtttcaaaag     60
tagacttttc tcctcagcct ccatataatt atgctgtcac agcttcctca agaattcaca    120
tttatggccg atactcccaa gaacctataa aaaccttttc tcgatttaaa gacacagcat    180
actgtgctac ttttcgacaa gatggtagat tgcttgtggc tggcagtgaa gatggtggag    240
ttcaactttt tgatataagt gggagggctc ccctcaggca gtttgaaggc catcaaaagc    300
agttcataca gtagatttta cagctgacaa atatcacgtg gtctctgggg ctgatgatta    360
tacnagttaa atttatgggg atattncaaa cttccaaaga aaattttgnc catttaaaag    420
aacactctng antatggnga aggtgnggnt tgtgcctaac caaacttaat tccgggatct    480
tttttatnta ccnggattcn tttggatctt ncnggtaaaa aanggttgga tnccccnaac    540
nnattgaaaa nngttctntc cnnttgacct nggccanccn ng                       582
```

<210> 22
<211> 349
<212> DNA
<213> Homo sapiens

<400> 22
```
actttttttt tttttttttt ttttttgaga tggagtcttg ctcttgttgc ccaggctgga     60
gcaacctccg cctcctgggt tcaagtgatt ctcctgcctc aacctcccga gtagctggga    120
ttacaggtgc ccgccaccat gccgagctaa tttttgtatc cctagtaaag acggagtttt    180
```

```
gccatgttgg ccaggctggt ctcgaactcc taacttcatg atctgctcac catggcctcc    240
caaagtgctg ggattacagg cgtgagccac tgtgcccaac cctcttttcc tttttcaaat    300
gtcaatggaa agttgattgg aaaggacaat ttggctacct tttggtacc                349

<210> 23
<211> 576
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(576)
<223> n = A,T,C or G

<400> 23
acctgttctt ggagccaatg tgactgcttt cattgaatca cagaatggac atacagaagt     60
tttggaactt ttggataatg gtgcaggcgc tgattctttc aagaatgatg gagtctactc    120
caggtatttt acagcatata cagaaaatgg cagatatagc ttaaaagttc gggctcatgg    180
aggagcaaac actgccaggc taaaattacg gcctccactg aatagagccg cgtacatacc    240
aggctgggta gtgaacgggg aaattgaagc aaacccgcca agacctgaaa ttgatgagga    300
tactcagacc accttggagg atttcagccg aacagcatcc ggaggtgcat ttgtggtatc    360
acaagtccca agccttcctt gcctgaccaa tacccaccaa gtcaaatcac agaccttgat    420
gccacagttc attaggataa gattattctt acatggacag caccaggaga taattttgat    480
gttggaaaag ttcaacgtta tatcataaga ataatgccag tattcttgac taagagacag    540
ttttgatgat ctcttaagta aatactctga ntgccn                              576

<210> 24
<211> 618
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(618)
<223> n = A,T,C or G

<400> 24
acttaaaata aagttaacaa ttacaacaga cccaatcaca gacaatacca gcgtagaaat     60
attaactcca gaattatgac ttttatcagg agtaggagta ggagtaggag taggtgtagg    120
atcaatgtca tcaggatttg cttgagggat aaacaaagtt acttgtgcaa tgttggatac    180
ttttgatgtc aaattgcttt tatctatact tttaatggca ataaatatgt gggttgcatt    240
ttcttctgag atattttctg gtttaaatgc aaagctttcc ttggagttgg cctcctttgg    300
tgacagatca gtagtattta cttgaagagc atcatcaaaa ctgtctctta gatcaagaat    360
acttgcactt attcttatga tataacgttg aacttttcca acatcaaaat tatctcctgg    420
tgctgtccat gtaagaataa tcttatcctc atgaactgtg gcatcaaggt ctgtgatttg    480
acttggtggg tattggtcag caagggaagg cttgggactt gtgatccaca aatgccctcc    540
ggatgctgtc ggctgaaatc ctccangtgg ctgagtatcc tcatcaattc aggtcttggc    600
nggttgcttc aattnccc                                                  618

<210> 25
<211> 595
<212> DNA
<213> Homo sapiens
```

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 25
acataccacg ctgggtagtg aacggggaaa ttgaagcaaa cccgccaaga cctgaaattg 60
atgaggatac tcagaccacc ttggaggatt tcagccgaac agcatccgga ggtgcatttg 120
tggtntcaca agtcccaagc cttcccttgc ctgaccaata cccaccaagt caaatcacag 180
accttgatgc cacagntcat gaggataana ttattcttac atggacagca ccaggagata 240
attttgatgt tggaaaagtt caacgntata tcataagaat aagtgcaagt attcttgatc 300
taagagacag ttntgatgat gctcttcaag taaatactac tgatctgtca ccaaaggagg 360
ccaactccaa ngaaagcttt gcntttaaac cagaaaatat ctcagaagaa aatgcaaccc 420
acatatttat tgccnttnaa agtatagata nagcaatttg acatcnaagt ntccacattg 480
nacaagtnac tttggttatc cctcagcaaa tctgatgaca ttggatctac tctactctac 540
ttctanttct gaaaaaggat aatccggngt aaattttccc tggattgctg ggatg 595

<210> 26
<211> 361
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(361)
<223> n = A,T,C or G

<400> 26
acttttttttt tttttttttt ttttttctga gcatattata tctaattttt gaaggttgta 60
ttttctccct tgttttaatt ttctgcanat actttttttct tttttacttt ccccaattag 120
tttgtttctg actttcttcc tcaatctctc ctgaaccatt gtttnttttt aagatcagag 180
cagattctta ggaactttta aaactgtatg tgggtgggat tgtcacctan agtgcttttt 240
tggagagtaa ttggatggng tgataattaa ttttatgtgt caatttgaca gggtcttggg 300
gtgtccagtt atttggttaa acattatttc tgggtgtgcc taaaagggtg tcccgcgtac 360
c 361

<210> 27
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 27
acctgttctt ggagccaatg tgactgcttt cattgaatca cagaatggga catacagaag 60
ttttggaact tttggataat ggtgcaggcg ctgattcttt caagaatgat ggagtctact 120
ccaggtattt tacagcatat acagaaaatg gcagatatag cttaaaagtt cgggctcatg 180
gaggagcaaa cactgccagg ctaaaattac ggcctccact gaatagagcc gcgtacatac 240
caagctgggt agtgaacggg gaaattgaag caaacccgcc aagacctgaa attgatgagg 300

```
atactcagac caccttggag gatttcagcc gaacagcatc ccgaggtgca tttgtggtat     360
cacaaagtcc caaacctttc cttgcctgac caatacccac caagtcaaat cacagacctt     420
gatgccacaa gtcattagga taaaatattc ttacatggan gcccangaaa taattttgat     480
gttngnaaag ntcaccgtnt ntataanaat aaggccagtt ttttgactaa aaaaagtttg     540
aagagctttc aagaaancta tgatttgncc caaggggccc tccaggaagn ttgttttacc     600
caaattttn a                                                           611

<210> 28
<211> 443
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(443)
<223> n = A,T,C or G

<400> 28
cgtgcccaaa gcttggcaag ttttcggctt taaccacgca caccaccacc accaccatnc      60
taaataactt actgcatcct caaagcctgt tttatgggga ttgcatggtt ttatttgaaa     120
tcacgcctgt aatcccanca ctttgggagg ccaaggcagg cagatcacaa ggtcaggaga     180
tcgagaccaa tctggctaca cggtgaaacc ctgtctctat taaaaaaaat acaaaacaat     240
tagccaggca tggtggcagg cgcctgtagt cccanctact cgggaggctg angcaagana     300
atggcgtgaa acttggaggc ggagcttgca atgagccgag atcgcacttg ctgcacttna     360
acctgggcaa caaaacgaga cttcatntct nttttnnaaa nnnaannnnn nnnnnnnnng     420
tcctttggcc cgaccacnct tan                                             443

<210> 29
<211> 403
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(403)
<223> n = A,T,C or G

<400> 29
ggtacttttt tttttttttt tttttttttg gagtgcatat catcacccca acttcggttt      60
tttacatttt aatttgtatt gnttttaatt tattttgagg caatgtctca ctatgttgcc     120
caggctggtc tcaaatgaaa acaatgctat caatcacatt cttgcatagg atatgtgtca     180
gtaatcctcc aaaatgaaca tganaaatgg aattgtcaag tcatagatta agtgcatata     240
acttttgaat agatagtata aatttttttcc ccaaatgaga attttatatt ctcactggca     300
acatgaaaat agccatctct ctataatctt atcaaccctc gatagtgtca ttttttaatt     360
tataattatg agtgaaaatg gtcctgcccn ggcgggcgct cga                       403

<210> 30
<211> 615
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
```

<222> (1)...(615)
<223> n = A,T,C or G

<400> 30
ggtacagtgg tagcatccaa atgggcaaac gtagtagcag gggcagggtc agtcaagtca 60
tcagcaggca catagatagc ctgtactttg taatattctt cccaccccttg agaatggact 120
ttgtaagatc cgcccccctgc ccacaaaaaa atttctccta actccactgc ctatcccaaa 180
cctataagaa ctaatgataa tcccaccacc ctttgctgac tctcttttca aactcagcct 240
gcctgcgccc aggtgattaa aaagctttat tgctcaccca aagcctgttt ggtggtctct 300
tcacacagac gcgcgtgaca gaaaccactt gaagcccggg cgcggtggct caggcctgta 360
atcccagcac tttgggaggc tgaggtgggt ggattacctg aggtcangag ttcgagacca 420
gcctgaccaa catggtaaaa ccctgtctct actaaaaatc aaaaaaanta accnngggtg 480
gtggnnggca cctgtaattc agttcttggg accttangca ngaaaatcct tgaacttgga 540
ggcggaggtg catanttgaa acaaaccttg nctcaacctg gnaacaaaat aaaaatccgn 600
tnaaaaaana aaaaa 615

<210> 31
<211> 485
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(485)
<223> n = A,T,C or G

<400> 31
acgcggggat aagctacaac ataaacacat ctaggttctt gttcttagaa tacagcatga 60
agaatttgct ttcttctttc ttcctaacat tttcatgtga gatccagaaa ggacacattg 120
tctctggcca ttcgaagaaa gaaagaaaga aagaaaaaaa aggtatttag agacagagag 180
agaaaaaggc tgaaatgggt tcgctgggtt ctaaaaatcc gcaaaccaaa caagcccaag 240
ttcttctttt gggacttgac tcagctggga agtctactct cctttataaa ttaaagcttg 300
ctaaggatat taccaccatc cctacaatag gtttcaatgt ggaaatgatc gagttggaaa 360
ggaatctttc actcacagtc tgggatgttg gaggacagga aaaaatgaga actgtttggg 420
gctgttctgt gagaacccna tnggctngtg tatgtgtgga cagtccttcg gcccgaaccc 480
cttan 485

<210> 32
<211> 780
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(780)
<223> n = A,T,C or G

<400> 32
cgaggtacgc gggtgtctag accttatgtc aaaataagcc caattgtatt aaagagtatt 60
aaattgtatt aagaataaaa acacatggcc gggcacggtg gctcacgcct gtaatcccag 120
cactttggga ggacgagatg ggcggattac aaggtcagga gattgagacc atcctggcta 180
acatggtgaa accccgtctc tactaaaaat acaaaaaaaa aattgtccag ccgtggtggc 240
aggtgcctct agtcccacta ctccagagct gaggcaggag aatgatgtga acccgggagg 300

```
canagcttgn agtgagccng agatctcgcc actgcactcc ggcctaggcg acagagcgag   360
actctgtctc anaaaaaaat aatgantaaa aaaanaagtc ctgcccggcc ggcgntcnaa   420
nggcgaattt cancacatgg cngcngttac tatggatccn actcggtcca anctggcgta   480
atcatggcat agnttttnct gtggnaaatg gtatccgtnc aantcnccna attcaaccgg   540
agcttaannn ntaacctggg gcnatnnnnn nctacttcat tattgcntnc ntatggcgct   600
tncattggaa ctnttgcnct gnntatnatc gcccnccngg aaagnnttnn ntgggncctt   660
ctctgttann atctnnggct tngttgggag gntnctntna gnggntngtt tnatnggtcc   720
ngnaaatttc agcctangnc antnagcctn ttgnttaatc tccnactnna aaaaataang   780
```

<210> 33
<211> 742
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(742)
<223> n = A,T,C or G

<400> 33

```
acataccagg ctgggtagtg aacggggaaa ttgaagcaaa cccgccaaga cctgaaattg    60
atgaggatac tcagaccacc ttggaggatt tcagccgaac agcatccgga ggtgcatttg   120
tggtatcaca agtcccaagc cttcccttgc ctgaccaata cccaccaagt caaatcacag   180
accttgatgc cacagttcat gaggataaga ttattcttac atggacagca ccaggagata   240
attttgatgt tggaaaagtt caacgttata tcataagaat aagtgcaagt attcttgatc   300
taagagacag ttttgatgat gctcttcaag taaatctact gatctgcacc aaaggaggcc   360
aacttcaagg aaagctttgc atttaaccan aaaatattta taagaaaatg cacccacata   420
ttataccatt aaaagttnga taaaacantt tgcctcaaaa gtttccacca tggacaagta   480
acttggttat cctnagcaat cttgtgcctt gattactcnn ctctattcta tcctgtnaaa   540
gcntaatctg agtaaaattt nccctggntt gtggattggc tngtnatgta atttnttaag   600
nctggcngac cnctaggnaa tnnccttggg cgttangncc gtngccantt gtattngtaa   660
tttctngaat gtnntcnncn nnntaccngt aagnatgggn tnggnnatnn atnttttncn   720
tnttnatnnn cntnnannnn tg                                            742
```

<210> 34
<211> 763
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(763)
<223> n = A,T,C or G

<400> 34

```
ggtcaaatga ggaataatga ggaaacaaaa ccatacatac aagagggatg gcacagacct    60
tgtgacaaag tggtcctgaa atttctggag gggaaatgaa taagaataac cgagatagtt   120
atgcttggag gaagaggaag atcaaggtgt cctaacctac cagaaactaa gacttatgaa   180
accttagtca ttaaaatatg tagtattagt tcagaaatag taaataaatc aatgtaactg   240
aatggaacct gggaacaaat atagctacat gtaagatctg ggtatatgct ggaggtgaca   300
taacaaatga agagaaacaa tggactattc aaagctgtgt tgctatcttt attggcaaca   360
aatatgggaa aaaatnaaat gagatcctat tcacatgaat gacaaaaata aatgccatat   420
tgattaaacc taaatatgac aaggaaggcc tcaaatttta gaaaaaaatg ccaaattnta   480
```

```
cncattggga gataattcat taacaagacc aanaaccnta aggaaagatg ntaatttnga     540
tatattaaga tttactatgt ttataaatca aggatagtcc cgcttaagan actttctttt     600
atttttaatt aatattatta atatttgana cttgcttgnt tnggtgaacc ggtaatttgg     660
tattnacctt ctccggttan gattnnctaa nccntgtgnt nngttgnncc ncncnatttt     720
tntacagttn ttgcgcgnta ttncnggnng cccccnnngn ngg                       763
```

<210> 35
<211> 767
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(767)
<223> n = A,T,C or G

<400> 35

```
acaggggaat ggaatggaat ggaatgcaat ggaatggaat catccgtaat ggaattgaaa      60
ggaatggaat ggaatggaat ggaatggaat ggaatggaat ggaatcaact cgattgcaat     120
cgaatggaat ggaattgaac taacccgaat agaatcgaat ggaatggaat ggaacggaac     180
ggaatggaat ggaatggaat ggaatggaat ggaatggaat ggaacggaac ggaatggaat     240
ggaatggaat ggaatggaat ggaatcaacg cgagtgcagg ggaatggaat ggaatggaat     300
gcaatggaat ggaatcttcc ggaatggaat ggaatggaat ggaatggaat ggaatgaaat     360
gcaatggatt caactcgatt gcaatggaat ggaatanaat ggaatggaat ggaatggagt     420
ggaataattc naatagaatg gaatggaatg gaatggaacg gaatggaccg gatggaacca     480
attgtaatgg aatggaattg atggaatgga atggaatcac cctagtcaan ggaatgtatg     540
gaccggattc aatgaatgga tattccgnat ggatggatgg gaatgaattg atgattggat     600
ggatggatca ccatccatga agattgatga tggatgatgc cacccatgat gattatgnat     660
tagngtnata tctncatnna ggatgntncn attatgngnt gatgacatga ntannccnnc     720
nctttnancn tattttttttg ggnccccctc ccagttgntt taaannn                  767
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<210> 36
<211> 608
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(608)
<223> n = A,T,C or G

<400> 36

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acatatagtc aacgaaatat tcaaagaata actttatata ctcttgttct ttaaattcta      60
tcctctcttt cagaattctt ccatttaagt ttgggtattt tcctagtttc aacagatgaa     120
cagaagactt cattgaacat tttgacagta agctactaga gaccaattat caactggtgc     180
tacacatgct gtgttatctc ccttactatt aaactataac cctctcttgc tattttgttt     240
catgcatcac caaccaaact tcattttttc taataaaaaa taaatatata aagaagacac     300
tgacaggcat atattcacaa gatctcaact tcttaaaaca taagtatggg tatatttatt     360
tctctcaaat gcatacnaga caataattac ncagcaacca atcttttgtt caacaatgat     420
ttgantcata agcatttgga aattacataa tttcatatca atanccctgt tttttnaata     480
cagaagtaaa aaanccccaa taaccaatct taaatttcna ttatcccctt acctccaacc     540
tttnaaaggt cccaccgggc cttttccnac attaatttgg tnaaactggg gttnaaaacc     600
gcctnccn                                                              608
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<210> 37
<211> 245
<212> DNA
<213> Homo sapiens

<400> 37
acagacatgg cggcggcttt tcggaaggcg gctaagtccc ggcagcggga acacagagag 60
cgaagccagc ctggctttcg aaaacatctg ggcctgctgg agaaaaagaa agattacaaa 120
cttcgtgcag atgactaccg taaaaaacaa gaatacctca aagctcttcg gaagaaggct 180
cttgaaaaaa atccagatga attctactac aaaatgactc gggttaaact ccaggatgga 240
gtacc 245

<210> 38
<211> 630
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(630)
<223> n = A,T,C or G

<400> 38
actacactga attcaccccc actgaaaaag atgagtatgc ctgccgtgtg aaccatgtga 60
ctttgtcaca gcccaagata gttaagtggg atcgagacat gtaagcagca tcatggaggt 120
ttgaagatgc cgcatttgga ttggatgaat tccaaattct gcttgcttgc tttttaatat 180
tgatatgctt atacacttac actttatgca caaaatgtag ggttataata atgttaacat 240
ggacatgatc ttctttataa ttctactttg agtgctgtct ccatgtttga tgtatctgag 300
caggttgctc cacaggtagc tctaggaggg ctggcaactt anaggtgggg agcagagaat 360
tctcttatcc aacatcaaca tcttggtcag atttgaactc ttcaatctct ttgcactcaa 420
agcttgttna gatagtttaa gccgtgcata aattnacttc caaatttaca tactctgctt 480
anaaatttgg ggggaaaaat taaaaaatnt aattggccag gatnttggna atttgttata 540
atgaatgaaa cattttngna ttaaaaatca nattacttnt aanctttgat aaantaaggc 600
atggntgggg gtaattgggt tttttgttcc 630

<210> 39
<211> 626
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(626)
<223> n = A,T,C or G

<400> 39
acagtggtcc ttttcagagt tggacttcta gactcacctg ttctcactcc ctgttttaat 60
tcaacccagc catgcaatgc caaataatag aattgctccc taccagctga acagggagga 120
gtctgtgcag tttctgacac ttgttgttga acatggctaa atacaatggg tatcgctgag 180
actaagttgt agaaattaac aaatgtgctg cttggttaaa atggctacac tcatctgact 240
cattctttat tctattttag ttggtttgta tcttgcctaa ggtgcgtagt ccaactcttg 300
gtattaccct cctaatagtc atactagtag tcatactccc tggtgtagtg tattctctaa 360

aagctttaaa tgtctgcatg cagccagcca tcaaatagtg aatggtctct ctttggctgg 420
aattacaaaa ctcaaagaaa tgtgtcatca ggagaacatc ataacccatg aaggataaaa 480
gccccaaatg gnggtactga taataacact aatgcnttaa gatttggtca ccctctcnct 540
aagggagccc attgagccna nggngctaaa gcctcatact ccacctgaat ggttaggaga 600
aaatttatcc caaaaaaaaa aaaaan 626

<210> 40
<211> 645
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(645)
<223> n = A,T,C or G

<400> 40
cgaggtacgc gggcaggaca tttaaaaggt ttcagcagaa atcttatgat tatgtctgac 60
ttgcagtatt ttatttgcct ctttgacggc tttttttttt tttttttttg agacagagtc 120
tcacactgca ctccagcctg ggtgacagag tgagagactc cgtctcaaaa atgaatgaat 180
gaatgaatga atgaatgaac aaacgaacaa ggtggtttaa tgtcagaaaa cttcctaagc 240
atttgctccc caaacctttc atgtttttca agaagccttt attacataaa ggggaataga 300
attaaaatgt ttctttataa gaaaaatata catatttgtg ttcttggccc cattaaaact 360
aatcagtagt cctttggcca aaaaatagtc aacaaganaa ctgggtatga ntccnggcnt 420
tactcctgnt cataagtgng gatgcntgtg tctganccna actgnctcaa ctngagctct 480
tggggtataa caanaaaccc gngttttcat gaaacccctg ggccnttata aaaggtttcc 540
cttggggggc ccaatgctta ttntngattn gggttccaaa anntngcaat tggnataggt 600
gcttgaaata accccctttt agtnnaattc cnaccaaaac cntgn 645

<210> 41
<211> 616
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(616)
<223> n = A,T,C or G

<400> 41
acgcggggct cttcacgagg tggaaacaag atggaggatt cggcctcggc ctcgctgtct 60
tctgcagccg ctactggaac ctccacctcg actccagcgg ccccgacagc acggaagcag 120
ctggataaag aacaggttag aaaggcagtg gacgctctct tgacgcattg caagtccagg 180
aaaaacaatt atgggttgct tttgaatgag aatgaaagtt tatttttaat ggtggtatta 240
tggaaaattc caagtaaaga actgagggtc agattgacct tgcctcatag tattcgatca 300
gattcagaag atatctgttt atttacgaag gatgaaccca attcaactcc tgaaaagaca 360
gaacaagttt tatagaaagc ttttaaacaa gcatggaatt aaaaccggtt ctnaagatat 420
ctcctccaac tctaaanaan gaatataaat cctatgaacc aagctcgcct tttaacagtt 480
tgattcttcn tactgatcca aaataagcgg ttttacctcc ttattgggag acattntttta 540
aaaaagaaag tccatntntg naaccttttt ccaaaatttn tcagananac atgctgnttg 600
gngacggctt aaaatt 616

<210> 42

<211> 259
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(259)
<223> n = A,T,C or G

<400> 42
ngtacggtcg gtggcagtgc tattctgaga tctgtagatg cttagaatat cagtattttg 60
gatgttgctg cattttacaa tttatttgga gtcttccttn atttcctcc agatatatga 120
aaatatgcaa tacctgctta tatcatgtag aaaagcttag caattattaa tttttctnta 180
tttcatttta tttgaccaaa gtcggtgctt cacttgactc antgtgtttt aggtgttngt 240
ntttntacct ttccggtca 259

<210> 43
<211> 509
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(509)
<223> n = A,T,C or G

<400> 43
acgagtgtat ttttgatggg aaggccatgc taaatctata aaacagatgt ttcctctccc 60
aacagtggtc accagtagtt tcaacttttt ccccccagta gcatcaacca aacttagcat 120
agtgattttt aactctttgc tcccacacgc actcatccca acttccccgc ttgccccact 180
ccctgggggg aaataaccct gcctttaaaa taaatagcaa ccaagtgctc agttctatgg 240
aaagtatgaa tatttatttc aggctttcga tcccaatcga tttcaaaaaa caaagtctga 300
tttctctcct cagagcagct gaggcctcca tgttacgatg gtttcatgga gattgaagga 360
gcacatttca tcaggcttag cacaaagtcc ctgatgccca ccatgtccca gccttagnaa 420
aggaaagaaa cagaattcac caccatgggg ctgaacgaat gccacaccta atgtaaatga 480
ncagctaacc ttggccaaat tgtggtttt 509

<210> 44
<211> 544
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(544)
<223> n = A,T,C or G

<400> 44
ttttttaaaa gtgtcactna ntctttaann anatncatta ccattttttt tncaaantaa 60
attacggttt taaanggaan acacatggna atntananaa ncaccgnnga annttaanta 120
cctngggngc gancanactn anggcgaatt cgaaccaatg ggggcngnaa cnaggggatc 180
ccagctnggt accaaaattg gcgtnatgat cgcaatagcg gtacctgtgn naaanggtta 240
ttcnntngta aaancagann tcntnnaagn nngaccaaaa aangtaaatc ctggggtgcc 300

taatgannga tntaaancna ttaattgggn tgcccacctg cnantttatc gttcaaaaac 360
ccgttaaacn ngtgnaaaaa tgaatngcca acccntngga aaagccgnat cntttgggng 420
ctttttccttt ttggtcctna cncttcctan nngnnngttt gggnncggnt nagttcntaa 480
aggcgnaaaa catttacaaa aatagggggaa ancccgaaaa acatttaccc nagccacctt 540
ntcn 544

<210> 45
<211> 630
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(630)
<223> n = A,T,C or G

<400> 45
ggtactctct atcactgaca aatgcaggct ggattcttat tatatacaga gatggctcaa 60
aaatggggtt tcagatcttt gtgacgaaat agaatactgt ttcatatttg aatcagaggg 120
cttcttgttc tgagaaatag gttcaaaatc attggaacca ggaacaagaa tagcttattg 180
ttatctgtga taacactgtt ttctaaacac aaggattttc ttttttatta atatgcaaca 240
tagacattgc cataacagaa taataaacca catgtggggt tttaaaaatg aaatttggct 300
aataggagca attcagctat ttttctatca agaaattggg tggggtggga tagaaagaaa 360
aaccgggttc aaccccactt ctgcccccta accagctata tggcctggat ggagcattca 420
acctttaata agggtcaatt tcntctgttn aaaagacccc aaacctggaa atcacnttng 480
cctctccctg aaaataanaa ggctngattt ttggaataan aaacataatg nangctnggc 540
ccaatggctc gccccgtaat ccaccctttg gaggccangc ggncggacac ttgaggtagg 600
agttgaacca cccgccacct gggaacccnn 630

<210> 46
<211> 622
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(622)
<223> n = A,T,C or G

<400> 46
tttttgactc ccaaagtcat tttatttaac aaaggggtca aggcagagga aagtttccct 60
taatatcccc acaactgctc cacatgtctt ctgtggaaac acttcaccag gaactagctc 120
aacactcttg ctaacaattt agtgtctata caggaaggct ggtgtctctg ttacaggtgg 180
cccgttcctt aaagccttta gggttaatcg cagctgcact gagtggccaa gcagaccctg 240
ttgggatgtg aaagcagttt gttaacaggg cccctggccg ggcccagagg ctgtcagact 300
cancaagtaa cactgaatgt ccaaaaatac ggctgtgtta aactaacaag ccaatccttc 360
tgctcagatc tctggataga aatgattttt cttttatcta tgggggaatg caatttcatc 420
acaacccctt acataaacgc tcctgaaacc ctttcagtag acagcatttc aattcaaaaa 480
ccaaaagtga aactatcttt gaaaacangg acctggctgg gaaaccatgc acacctcggc 540
gaacactttt cccccccacg aacttggact ttntgggaag gtggcgggtt tttggcnaaa 600
acattcttga agcntaggaa gg 622

<210> 47

<211> 253
<212> DNA
<213> Homo sapiens

<400> 47
ggtactttgg tttgaaaaca acacttagag cctccagata acttttaaga cttatttagc 60
tttgtgggtg gtattttcat gcaaataagt aagggtgggt tttatatttt gtagaagttt 120
tcggtcctat tttaatgctc tttgtatggc agtatgtata tattgtgtta agttcctcaa 180
gaatctcctt aaaaactttg aagttaatac ttttgtgcaa ctgtgttttg aataaagcca 240
tgacagtgtt aaa 253

<210> 48
<211> 607
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(607)
<223> n = A,T,C or G

<400> 48
acttacatat cctacatttg actacattat ttccaaacca agtattccat ccaaaggaac 60
atactgctat catagagacc aaggagggac tgtttaaagt tgccaaggtg aagcgagctg 120
agaggctttg tcctcgtgcc agtaactctg aaatttctct taattcctgc tgtccaggca 180
gcagaatgcc atggtttccc caagtaggta gctgctttag cagttaaagc ccaaatgtct 240
gttctgttga tcaagaggtc tctgaatttc tgaagtggtg tttcgtttct ggtgactgag 300
ttaatccttt acaatncctc ttgtaaagtg tgctaataga aagaatccac ctttcaaagc 360
tgcagaacca naccgtgccc taaattgacc aaccgtanct gatgtgcctn angaagtctt 420
ttgccaactg ccctgtgaan acccctnctt ccccccagct ngtggcttgc acactgaaca 480
tttaaactgn gcaaagccgt gtagttataa nacagtaaat cccaaggctt ggttaantgc 540
tgggnnaaaa ctggttggat anacttaact taaaacccct tacataaacn tnggaactcn 600
aagaaaa 607

<210> 49
<211> 421
<212> DNA
<213> Homo sapiens

<400> 49
ggtaccactg gatgaggggc cgggacatac tgactgcccc tttgacccca caagaatcta 60
tgatacagcc ttggctctct ggatcccttc tttgctcatg tctgcagggg aggctgctct 120
atctggttac tgctgtgtgg ctgcactcac tctacgtgga gttgggccct gcaggaagga 180
cggacttcag gggcagctag aggaaatgac agagcttgaa tctcctaaat gtaaaaggca 240
ggaaaatgag cagctactgg atcaaaatca agaaatccgg gcatcacaga gaagttgggt 300
ttaggacagg tgctgttccc gagactcagt cctaaagggt ttttttccca ctaagcaagg 360
ggccctgacc tcgggatgag ataacaaatt gtaataaaag taacttctct tttctttcaa 420
a 421

<210> 50
<211> 624
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(624)
<223> n = A,T,C or G

<400> 50
ggtacttcag tattgcattc tattcctctt aatgttttta tgggatctcc agggaaagag 60
gaaaatgaaa accgtgatct aacagctgag tctaagaaaa tatatatggg aaaacaggaa 120
tctaaagact ccttcaaaca gttagcaaag ttggtcacat ctggtgctga aagtggaaat 180
ctaaatacct ctccatcatc taaccaaaca agaaattctg agaaatttga aaagccagag 240
aatgaaattg aagcccagtt gatatgtgaa cccccaatca atggatcctc aactccaaat 300
ccaaagatag catcttctgt cactgctgga gttgccagtt cactctcaga aaaaatagcc 360
gacagcattg gaaataaccg gcaaaatgca ccattgactt ccattcaaat tcgtttattc 420
aaacatgatc aagaaacgtt ggatgacttt aaaaaanatg ccntaaggac anttgtgatt 480
tgcaggtggg aagatnaaca gttcatatcc actgaatgaa atgcatcttg tggaaganct 540
catgnatnaa ggttaatggc tgaaatgaaa actccaaaag aaaccaaaaa ataccggccc 600
ctttgaaatt cagggannncc tatg 624

<210> 51
<211> 632
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(632)
<223> n = A,T,C or G

<400> 51
ggtacgcggg ggaaacggaa gtgagcggcg gggtcgactg acggtaacgg ggcagagagg 60
ctgttcgcag agctgcggaa gatgaatgcc agaggacttg gatctgagct aaaggacagt 120
attccagtta ctgaactttc agcaagtgga ccttttgaaa gtcatgatct tcttcggaaa 180
ggtttttctt gtgtgaaaaa tgaacttttg cctagtcatc cccttgaatt atcaagaaaa 240
aaatttccag ctcaaccnaa gataaaatga atttttttccc cctgaagaaa cattcagggc 300
tattttgctt cccttaaaat accagaatgg gattcaaggg cagtgccacc aggtcaaccg 360
ctttcatttc tttcaagcct caaatctttc acttgaatgt ttgaagggta atggatgaag 420
acctattgga attgagggat atctttaatg atccgcccca aaccgaatcc ttggaaaagc 480
cacccttgat ggtggaatat aaccttggtt actgaatatg tgcctgtcat ggaaccgagg 540
ccgcatctgg ttatagcatc tttgacctgc cggccgcccc aaaggcgaat ccacncctgc 600
ggccgttcta tggaccaact cggnccaact gn 632

<210> 52
<211> 623
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(623)
<223> n = A,T,C or G

<400> 52

acttttaatg gtgggaattt acagtagaag catcctttgc tgagttatac attcctttat 60
caatctcttt tgatacaaca tttaaaacaa gtagcttcaa gaaaccactg gtgttttgag 120
gatagtattt ctaaatagca ttcaggaaca gagtattatt gcacagatct gaagatcaaa 180
aaaaagctca aggaaataca gatcggaagt gctgatgagt tatatttatt gaaaacccaa 240
cttttaagga agtgctaaga tcagtcaccc atgtgaataa gaagccagga aaggaaagat 300
ggggaaagcc canatcacca ggcttctatt aaggaggaaa gcaacagang aaacagtgaa 360
agggaacaga aaggggtagc caagtgttac aaaaaanccg actggataac caaactncaa 420
aaagngtatg ttggggagaa ctgaaangga aaacaaaata cttgactaat cntaagtaga 480
aaaaagcagn tagagaaaac caaatatttc tggncctgtc acatacaact tcaaataccc 540
ttatanaatc caaaaatgat gtgtgtaagg naaaatttat tgccntccga aaaataantt 600
tntccaatnt gaaacaaatc aac 623

<210> 53
<211> 627
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(627)
<223> n = A,T,C or G

<400> 53
ggtacgcggg gtcgcatgcg ctgtggctaa tgccgtaggc tctttcaggg ctgagccatc 60
ctgcgtgtct tgcgctcggt ggaaatgccc agccgaggga cgcgaccaga ggacagctct 120
gtgctgatcc ccaccgacaa ttcgacccca cacaaggagg atctaagcag caagattaaa 180
gaacaaaaaa ttgtggtgga tgaactttct aaccttaaga agaataggaa agtatatagg 240
caacaacaga acagcaatat attctttctt gcagaccgaa cagaaatgct gtctgagagc 300
aagaatatat tggatgaact gaaaaaagaa taccaagaaa tagaaaactt agacaagacc 360
aaaatcaaga aatagtcaac ctgatttcac ataacaatgt gtggcatttg ttgttctgta 420
aacttttctg ctgagcattt cagtcaagat ttaaaagagg acttactata taatcttaaa 480
cagcggggac ccaatagtag taaacaattg gtaaagtctg atgttaacta ccagtgntta 540
ttttctgntc acgtnctaca cttgangggg gtttgactac ccancctgtg gaagaagaaa 600
gaagcaatgn ggttctatgg atggaga 627

<210> 54
<211> 565
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(565)
<223> n = A,T,C or G

<400> 54
ttttccttga gtgctccctt ttatgtcatt ttattttctt ttatgcagac cagtgggggg 60
aaaatcccat agattcttct ggaaactgtc aagatgctgg gaagatgaat gcaaaactta 120
catagattgg gatgtccaca gtttggattt tcaaggtatg gcttttgcag gatgacgtga 180
tcaacccaaa cttctgcttg atctggtttg tcctgaactc ctgccacttg ccgccaacca 240
gggcctctgc tctgatctca tacttcacca ggcgtgccgn tcgcaggctg acgtggttgt 300
gctcgtagac cgcagaggga gattccaggt ctgtgtgctt tattctctgc atgtaaaaac 360
tataagaggt agtatcatgt ttgagtccct ttatcttaaa gaagaatcca tatagagcaa 420

tcgttttcga ataagttgna ttctctgngt ctggcactgt gtccagtgct ctcanaggat 480
gcangggaga anaccaaaaa gtntctgagc agtctcacat gggaaataaa atgtgtcccc 540
ggtaccttgg ccgngaacac nctaa 565

<210> 55
<211> 451
<212> DNA
<213> Homo sapiens

<400> 55
acagagatga caagagaaag gcacaaatga ccggagtcag ggattgtggt gagggctcca 60
catgaagaca gcatgttgga ggagaccaag ttgggaaggg tgacatgtca tacatcaaaa 120
gttgccccaa gatagcaggt tataatgggc tagagagaaa ttagagggaa catctcttcc 180
ttcacttgaa caacaccaaa aatagaagac cagagaatag aaggatggtg acaaatccca 240
aaaaggaaat ggaggaggag ttcgtggaag ggcagaaaca ctttaatcct agagggaggg 300
tgaggcactg ttgaaaagag aagcaaactt tggcaggggt ggccattctg ccttgctgag 360
tcatgggctg agatacggaa gtcactttca atcattttct acttctccca gggcactcag 420
acaaaatcag tgcaaggtat atggaagtac c 451

<210> 56
<211> 623
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(623)
<223> n = A,T,C or G

<400> 56
ggtacgcggg gcttccgaga cgcactgggg gccggatgta gaatcctgct tatctgtgaa 60
atgcagttaa cacatcagct ggacctattt cccgaatgca gggtaaccct tctgttattt 120
aaagatgtaa aaaatgcggg agacttgaga agaaaggcca tggaaggcac catcgatgga 180
tcactgataa atcctacagt gtttcactct tgttgcccag gctggagtgc aatggcgcga 240
tcttggctca cggcaacctc tgcctcccgg gttcaagcaa ttgtcctgcc tcagcctcct 300
gagttgctgg gattacagat tgttgatcca tttcagatac ttgtggcagc aaacaaagca 360
gttcacctct acaaactggg aaaaatgaag acaagaactc tatctactga aattattttc 420
aacctttccc caaataacaa tatttcagag ctttgaaaaa atttggtatc tcaacaaatg 480
acacttcaat tctaantgnt tacattgaan aagggagaaa acnataaatc angaatacct 540
aatatcttca gtngaanggc atcaaggttc tcttgaaaac ttnccggaat aatgaatntn 600
ccnaagtcca aaanattttt aac 623

<210> 57
<211> 622
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(622)
<223> n = A,T,C or G

<400> 57

cgaggtactt tttttttttg ttttttttt tttggtttct gtcctttaat tttttaacag 60
aatatacaga gccacacaat acgatttcaa tttcaaatta tgggagatca tattcaaata 120
tgcttaggtt tgacaagttg ctgttacaat actgagaact ttcatgaaaa cggtatttaa 180
caatttttaa gataatcaaa tatcttttg ctacgtgggc caacgcatta atactaactt 240
gtttaaaaat gcagtctttt agacttcaaa ttattataaa acaatatcaa gatcatatag 300
atatacttcc tgattactca aaactcgttc cattctgatg gaggctgaag gtaaatgtta 360
ttatacatta gaacatttca tgaaaccact tctcctttgc acttacctgt aaaagtcaaa 420
aattaaacca caatttccta agacataact atttctagaa tacattggtg taatcataaa 480
agactacnag taaattatca tttttatcta acacttttta ccacacacat ctttcctaaa 540
aggaccnaaa aaaattggga atttggattc cttacataac aggactcata cttctgattt 600
aataaattnc actcttttca ag 622

<210> 58
<211> 471
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(471)
<223> n = A,T,C or G

<400> 58
ggtacttttt ttttgtttgt tttctagact taataaaagc ttaggattaa ttagaagaag 60
caatctagtt aaatttccca tttgtatttt attttcttga atactttttt catagttatt 120
tgtttaaaaa gatttaaaaa tcattgcact ttggtcagaa aaataataaa tatatcttat 180
aaatgtttga ttcccttcct tgctattttt attcagtaga tttttgtttg gcatcatgtt 240
gaagcacccg aaagataaat gatttttaaa aggctataga gtccaaagga atattctttt 300
acaccaattc ttcctttaaa aatctctgag gaatttgttt tcgccttact tttttttctt 360
ctgtcacaat gctaagtggt atccgaggtt cttaatatga gatttaaaat cttaaaatgn 420
ttcttatttt cagcacttac atcatttggt acctgccngg cggccgntcg a 471

<210> 59
<211> 618
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(618)
<223> n = A,T,C or G

<400> 59
ggtacataca caatcactca actggaacaa tcaaaaccat ctatgagtgt ggttattaaa 60
aaataaaatt acgttcatac aatggtagaa aatgaaatgt ttttattaat ttgattatta 120
atacaaaacc acacatatat gaattatata acctagtgtt atatatttaa aaatctttat 180
gcttgcaact gaaatgtctc tactccaagg gaagtttctg atttttaatt ttcttatttt 240
aaggaatcta ttatattcac aatgattaaa atgccttaca cataggcaaa aagcagaccc 300
aatcccagca aacagaaaaa ccataagtct atcatatcac catatgtttc accatatagt 360
tttgaaaaat aatcctattt gcagtttggt atgtcttcat atttatactt attatcaaag 420
tgattgcata ttgaggcaca gagcttaaag aggaaatata tattacttat aggggaacca 480
gacactgaaa caaggaatat caatcaatgg cttcaaacna aaaaaaaann nnnnnnnnnn 540
nnnnnnggaa aaggaaaagt cctgncccgg cggncgttca aagggcnaat tcaaccactg 600

ggggccgtac ttatggac 618

<210> 60
<211> 606
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(606)
<223> n = A,T,C or G

<400> 60
actttttaaa ccctcccaac cagccctttc tcaatattca tcaaatctaa aacatttagg 60
gggcaaaatt ctaacatgtt catggtatct tgcaaatagt aaaagcttta ttctgaagga 120
ttataaacta gttttctcca ttttaactag cactattttg tggaaattag aaacctcttt 180
tatttctctt cccaaaagta atacttatta taaggctgta gtatcaggtt aaggatacag 240
ataaataaag ttcacttata tcttcttaca aatgtctggg ttttaatatg gttaatcact 300
tatatacaaa tattacaact ttttagtgca agtttttgga agaaaacttt ttgataaaac 360
actgtgattg atgtgacttt atttttaatt taaacgatga ggtggccaga agaaagatgg 420
gtctaaaatt tctcccatga aagatgtaaa actatggctt ttttaaaatc aaaatttcat 480
ctttaaaata atgggttgaa atctggatng gatctgaaca gaataatcac atttaggatc 540
tatataaatc tcaactggag tntaactgaa ggaaataccn ngattttaag aaatatnttc 600
aaaaan 606

<210> 61
<211> 620
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(620)
<223> n = A,T,C or G

<400> 61
ggtacattct ggtatgaaaa catctcaaaa tgtaacaaca caagagtttg ggtcaagacg 60
acccacccag gaggctgtaa aaactggttt gaactagaac tgtggaatgg aactagttta 120
aaatatgaag cagctctaaa caccaagctt agagacattt gccctattag aaaacaaaaa 180
tcattaaagc tacaaaataa caagtgcaaa catgctgaac ctgtttccag ggagtgacat 240
tcccttctgc caacaggtcc caaactcaca cccacaaggt gtaactctct ttcctgttcc 300
actagatttc ctttctctca tctcaaaggt cctcagaaat gacaatggaa aacgtatgaa 360
ttgttgaaat ttaccctgtg gaccaattcc tgaagagata acagccacaa ctctgagatg 420
attaagacat gcagtgttta cttgatgact ttctgnattt ctagaaaccc tcaaagcatt 480
aaactgncta tttcaaaatc taaacttnct agcactttta ttatttggag taagcnnacc 540
gaagacaatt tactggccca caggaataac cacgcttact tgtcaccata agtttacggn 600
atggacattc actggaaaac 620

<210> 62
<211> 614
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(614)
<223> n = A,T,C or G

<400> 62
gccgaggtac ataaatctgt gatcccattt cttattgcac cattcaggaa cactttatat 60
aaatgagtgg ctttttattt catattatta gtagtatcat ggttccatta caggcctatt 120
aacatcatac attgtcatta gtctttgaag aaaaaatatg taaatatata tgtgtaacat 180
gagaatttct ctctaaagca gggcttaaaa ttttttggaa aagtttgaca aagcatacca 240
catgaattca gatttacctc aatgctaaga attatgttta gttaggaaaa aggaaagtca 300
ttttgacctc aggtagaaaa atagattgct ttgagtttta tgtagcttta gactttaaaa 360
agttagaatt tattctgtaa ctaaaaatta tttgaaaaaa ttatgcctct ggtttaatta 420
ttggtgatta cacactcttt ctcttaccct tgngtattga actatgtcca taatcaagtt 480
gatgtggatc ctgaaaaatg gtatgaacat ctgatgggat tggcacatta ttttaaaant 540
agcatctgac acttcaaaac tgtcantgng atgggttcac cataccacgg ntgaccntac 600
attaaatttt nacn 614

<210> 63
<211> 616
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(616)
<223> n = A,T,C or G

<400> 63
ggtacatata agagtaatta gttttattct ctctttttta taaaatcggg tttcagatga 60
gatgtttatc ttagactatt ttagggaaaa attttacatg tttgagatgg tggagtaaaa 120
agactgttaa acatttcttt taaaaaatta tttttacatt acaacaatat atttatgatg 180
tgttcagatc aaaaatttaa cttctgtgtc ccagatctac tttcaaagtg agattttcac 240
ttgtcagctt aaatttctga ctagaactaa catttgtgta tttttgtgct tagtcggaat 300
acaaatttca cagtggattt ttgaagtttg tccttaaatt ggataaaatc aagtgattaa 360
agttactaaa gagataaaaa tggtaatttc catttttaaa agtaatttgg ttgtgtttat 420
agttatttgt acttcgagtc tcccttcacc atttccgacg gcatctacng ctcaacattt 480
tttggtaccc cangctttca cggacttcac gtcattattg gctcaacttt cctcactatc 540
tacttcatcc gccactaata tttcctttac atccaacatc ctttgacttt naagccgccg 600
ctgatnctgc attttn 616

<210> 64
<211> 612
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(612)
<223> n = A,T,C or G

<400> 64
ggtacagata tcattncttg tgtatgccat gacttgaaaa agtttgggaa gctctttanc 60

aatatcagct aanaggatat gaaatcacag gtgatagcag ttgtcattca gtaatttcct 120
acaagcagca ccccaaagga aatatagtcc taatctttac tatccacttc taaatttaat 180
gtgaatttca tacatgttat tagttgtttc ctttataatt ttataaaaat tattcatcgg 240
gagtttaact tccacttcca tgctatcgga tgtgttgggc tccatgcaag aacttggaag 300
aaaaacaggc aggaatgcat ttgcataatg acccagatca tcattttctg caactgagaa 360
ttatatttca tcattgcttc tagaagtctg caattcttta cttttctttg gtgcattatt 420
atctangtgc ccatcactgg ataatgtgga gtgactagag aagtcatnta tcactggaag 480
gncctgcccn ggcggccgtt caaaaggnca antccagcan nctggcggcc gttctaatgg 540
gntccaactt ngggnccaan cttggngnan tcatggcnta acnngttccn gggggaaat 600
gntntccctc ac 612

<210> 65
<211> 599
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(599)
<223> n = A,T,C or G

<400> 65
acaagctaca aaatagcatc tctttcatgg tatgtttgag tgtgtaattt tagtttcttt 60
tctggttgta tttgtggtag tcagatgtgt tggattgatt ccaactggac agagtaagga 120
attccagcat cctcttcctg cttgctcgtg ttaccccaca gatcaaaccc tcaattctag 180
ttggggatgc tgtctagccc cacaccatga ctgaagcctt aagcactgtt gcgcctccat 240
gtgctttggg tcagcaaccc cagtggtatt ctaccagagc attgtgggaa ggcagatgta 300
tagtcaggtc ccaacagcaa attgttgggt gtgagagttc taaagtatag gggtgaaggg 360
aaagagaang atatgaactc ctctgacctt aaccacattc atttaacttt tatgcctact 420
taacaagaga acctggagaa aactatcgna ttcaagagat taatcaaaat cagggtttan 480
ccagccatga ccgaaancnc cttccttaac ctcatcttgn anggctgnaa naattcannc 540
ctaggatggt taanccagaa ccccngatga ttaantgtcc aaccttnatt tncatantn 599

<210> 66
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 66
ncatgacctt tagtggaaga ttatttggtc atcaaatacc catatccaag tttccatggg 60
gcctgggaat ttcctttcac ttggatagaa agtatatatt aggaaagtcc agttaataag 120
tatttttatt taaaaaaaaa aaaaaaggaa aaaagaatca gcagaagtca agttgtctta 180
agtcttaagg ctttctggat ttcttccttg gaggaggtca ggatcttccc aaggcctggg 240
tcctcgaata ttcttccagt catcaaactt ggagtctttg atttctcat attccgactc 300
taaagatatt ttattctctt tcagtttttt ttcaagctca ggatccattt tactcttcac 360
agcatcatat cggatttgag aaaactcacg aagaccaaaa gaaccttcaa caatcagcaa 420
caacatgggg actccatacc cagagtcttg gtcttgcgaa aagcacgcnt naaccgcggg 480
tgccaacatg agtgaactct ttcatcggtt naaactccaa cnggcctacg caaactccca 540

atttacaggt tangctttta ccaaacaagt ncctnggcgg gacnccctag gggaattcgc 600
cactgggggg t 611

<210> 67
<211> 639
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(639)
<223> n = A,T,C or G

<400> 67
nagaattcgn gcttncnagc ggtcgnccgg gcaggtacac tttacttaaa aactattaac 60
agtttttcat gttgcactgg tggtaatttt gaacttggaa ttactgggtg ggaattccag 120
gaaccacaga gtattgattt ttgctgccaa aatgctcttg aagcagatgt ccctgtgctc 180
ccctggctgc ttctggctga agggggagg tgtagactga agcttgggca ctcatgtgtg 240
tcccctccca gtccccatcc tagtggggcc agtctcatta ggcagccata gataagcctg 300
gaacttggct gcattagtga cttgatcctg gtatgaaatg catactgggt ataaagcctg 360
tcaagnattt tatttccttg gccacaactt ccatagatgc caatggtttg atagcctcag 420
tttctnaacg atgtcttttg gttacagtgc tcacttantg ngagtcaaga aatgcttgag 480
ttaccagaaa cttcttantc aggttgagta acnttttacn ttcatgngta nctnnggcgc 540
gaacaccctt angggggaatt ccacacactt ggnggccgta ctaanggatc caacttgggn 600
ccaacttggg ggaaaaangg cnaantggtt ccttgngaa 639

<210> 68
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 68
tcgaccggcc gcccggccng gnccttcccc atcactnnac tggnacnatc aaaaccntct 60
atgantgngg gtattaaaaa ataaaattac gttcatacna tggtagaaaa tgaaatgntt 120
ttattaattt gattattaat acaaaaccac acatatatga attatataac ctagtgntat 180
atatttaaaa atctttatgc ttgcaactga aatgtctcta ctccaaggga agtttctgat 240
ttttaatttt cttattttaa ggaatctatt atattcacaa tgattaaaat gccttacaca 300
taggcnaaaa gcagacccaa tcccagcaaa cagaaaaacc ntaagtctat catatcacca 360
tatgtttcac cntatagttt tgaaaaataa tcctatttgc agtttggnat gncttcatat 420
ttatacttat tatccaagtg atgcntattg angnccnaag ctttaagang gaattttntt 480
cctatngggg acccnaccct tgacccgaat tcatcaangg ntttaaccca aaaaaaaann 540
aaaaaaaaat ggnaangggg ctcccttnaa anccccccca acctntttnt ttaacnagnc 600
tnagcctttc a 611

<210> 69
<211> 606
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(606)
<223> n = A,T,C or G

<400> 69
accaaagcat tacccgcatg gtagagaaca cactcgatta aaaatgttaa gctatctgaa 60
aaataaaatg tgcaagtctt caggatggca caaaacaaag gtcaatgctt cttggggcac 120
atttcttaga gggcttgctg agtgtgtaaa tataatcgac ttttgtttgt gttacatgac 180
ttctgtgact tcattgaaaa tctgcacaat tcagtttcag ctctggatta cttcagttga 240
cctttgtgaa ggtttttatc tgtgtagaat gggtgtttga cttgttttaa cctattaaat 300
ttttattttc tttcactctg tattaaaagt aaaacttact aaaagaaaag aagtttgtgt 360
tcacattaaa tgggtttggt ttggcttctt ttaatcaggc tttctgaaca ttgagatatc 420
ctgaacttag agctcttcaa tcctaagaat ttcatgaaaa gnctntnact ttgaacccaa 480
accanaatac ctcggccgga caccctaagg cgaattccag ccactggcng gccgtactaa 540
nggatccanc ttggtnccaa cttggggnaa catggcnaac tggttccggg gaaatggatc 600
cccncn 606

<210> 70
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 70
ncgtggncgc ggccgaggtn cttttttttt tttttttttt ttttttttnn aaaangggta 60
accttaaagg tttantggcc ccccaaangn aacctggggt taatggcttc nnattttaaa 120
tttttggaaa ttaaaaaaat tacnagtttt aaatagccna tggctggnta tgttttcana 180
aaacatgatt agactaattc attaatgggg gcttcaagct tttccttatt ggctccanaa 240
aattcacccn ccttttgncc cttcttaaaa aactggaatg ttggcatgca tttgacttca 300
cactctgaag caacatcctg acagtcatcc ncatntactt caaggaatat ccgttggaat 360
acttttcana aagggaatga aagaaaggct tgatcatttt gcaagggccc caccacgtgg 420
gcgganaaat cacttctaca ggttattacc tgganngtca aagntttctg naaaacanct 480
tgctctcaac tggtttacca tttggtgctg gagctnacaa ccggtttaag gcccttggna 540
anggtccaag ncccaanaaa ctttcccggt ccttccggng gccttnaagg gaatccnccc 600
tgggggcgtt t 611

<210> 71
<211> 588
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(588)
<223> n = A,T,C or G

<400> 71

-124-

nctgggaacn ccgaaggtgg aaggccnttt cataacattt cttgtggatc aaaccaccgg 60
gacacctttt ttnccatcaa caggactagc gtcttgtcag tcttggtgac agtgacattg 120
aangtggggg cccaccggtg ctcttggtac tttcccaaga ggtcctcatc ctgagacggt 180
ctctacccat gtttaaccca aagagtgcag gccaggttcc ttatccttct gatgaaggat 240
gagagaactc atttagaagt cagagcaaac tagggtctca gtattgagaa acgcacctgc 300
canggaatca cagagacatc ggggtgcccg cgatggcctc atgaaccatg cctngacggn 360
attcaggaac cctgcaaacg tgctttttga ctcattggnc agtgtgaatt ttacacaagg 420
naaacctggt cnaaggcatt ngggaattgc tccaacnnat acttcctntt aggaacccaa 480
ggaancaggt tcncgaattt tgaaaactgg gtntgaagtt ctttcttcct ttgggnacaa 540
ggccttaaca aananacttgn ggnttccaaa tggncctggc cccacacc 588

<210> 72
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 72
ggtacaaact tagaagaaaa ttggaagata gaaacaagat agaaaatgaa aatattgtca 60
agagtttcag atagaaaatg aaaaacaagc taagacaagt attggagaag tatagaagat 120
agaaaaatat aaagccaaaa attggataaa atagcactga aaaaatgagg aaattattgg 180
taaccaattt attttaaaag cccatcaatt taatttctgg tggtgcagaa gttagaaggt 240
aaagcttgag aagatgaggg tgtttacgta gaccagaacc aatttagaag aatacttgaa 300
gctagaaggg gaagttggtt aaaaatcaca tcaaaaagct actaaaagga ctggtgtaat 360
ttaaaaaaaa ctaaggcaga aggcttttgg aagagttaga agaatttgga aggccttaaa 420
tatagtagct tagtttgaaa aatgtgaagg actttcgtaa cggaagtaat tcaagatcaa 480
gagtaattac ccacttaatg gttttgcctt ngacttttgg gttaagaata tttttaaatc 540
ctgnggctnc cttaattggc cgnttgncca ngggttccnn aaatgggttc n 591

<210> 73
<211> 581
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(581)
<223> n = A,T,C or G

<400> 73
acgcgggtat ctgtaatttt tataattcat caattctgga atgctatata taatatttaa 60
aagacttttt aaatgtgttt aatttcatca tcgtaaaaag ggatcatctc agagagaaca 120
gcagtattct gcgtattttt aaaaatgctc tagagtaaca tttgaagtaa ttcactgtag 180
tgtatgccag tcctagaaat aattttttta atttctggtg tctgtttcta atacactaac 240
caagttttca aaatatattt acaaagatgc atctttaccc attattttaa aatgattaag 300
gaggatagtt gcttcaggta acaagctaat ttttcaaata ttaggccctt acagaactat 360
ttagtcaaaa agtaagatat tcctttaaaa tatataaccc aaagctttca gttaaaccat 420
gatatatcac aaatactatt aaaatggtaa agagaaaatg caattgcant taatgatgcc 480
caaatngtaa aatatngaga ttcaaaagct gggnctttat ttaggnggga tnccaatgnn 540

aatgatactg gcctggnttt acctttacct tttaaaaaan a 581

<210> 74
<211> 599
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(599)
<223> n = A,T,C or G

<400> 74
cgaggtactt tttccgcaca tgccttgtgc ctatctgagt attgatgcca tggatgtggc 60
cggagaacag cagctggatg tggaacacaa cctgttcaag caacgactag ataaagatgg 120
catccccgtg agctcagagg ctgagcggca tgagcttggg aaagtcgagg tgacggtgtt 180
tgaccctgac tccctggacc ctgatcgctg tgagagctgc tatggtgctg aggcagaaga 240
tatcaagtgc tgtaacacct gtgaagatgt gcgggaggca tatcgcccgt anaagctggg 300
ccttcaagaa cccagatact attgagcagt gccggcgaag agggcttcag ccagaagatg 360
caggaaccag aagaatgaag ctgccangtg tatggctttc ttggaaagtc aaataaggtg 420
gcccgaaact ttcactttgc ccttggggaa ganctttcca gcantcccat gtcacntcat 480
tgacttggca aactttggnc ttgacaaccn tnaccatgac ccactacatc ancacctgtc 540
atttnggggga ggactttcna gccttgggaa acccctngac cccccaatgg taattggcc 599

<210> 75
<211> 594
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(594)
<223> n = A,T,C or G

<400> 75
acatcaaatt ataaatgcaa aacaggttca gatttcatct tttgtgattt cttttaaata 60
ctattcattt ttatttaaat gcacagtatt tcccctatat tttagtcctt ccattcctag 120
agacaaacca gttatttggt ggtgggaagt agctgaagca aagaaggaaa agtaatacct 180
ttaacctcac tagcttcaag agtagacatt cttactagct caatttaaat aattgatttt 240
aaataggaag aaaagaggat atatttaaga tacatagaaa ttatgatgtg aagtattcat 300
gagaatctgt agattccatc aaaataagta ggaactcatc taaaattgtt ggatttaaag 360
aggcactttt ggttatgatt caaatatggg gaatttgaga aatattcatt ttgnccactg 420
gatggtcact attttactaa aanggnagct ttttatgggg ggactgngac tgaggtctta 480
aagactgaaa gaagttgggg ggttcatttt cngtaccacc ttcnnggacc atttggacct 540
ttggccggga acacccctaa ggngnaattn cngnccctgg gggccgtcta atgg 594

<210> 76
<211> 585
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature

<222> (1)...(585)
<223> n = A,T,C or G

<400> 76
acgcgggggg cggagtagca agtggccatg gggagcctca gcggtctgcg cctggtagca 60
ggaagctgtt ttaggttatg tgaaagagat gtttcctcat ctctaaggct taccagaagc 120
tctgatttga agagaataaa tggattttgc acaaaaccac aggaaagtcc cggagctcca 180
tcccgcactt acaacagagt gcctttacac aaacctacgg attggcagaa aaagatcctc 240
atatggtcag gtcgcttcaa aaaggaagat gaaatcccag agactgtctc gttggagatg 300
cttgatgctg caaagaacaa gatgcgagtg aagatcagct atctaatgat tgccctgacg 360
gtggtaggat gcatcttcat ggttattgag ggcaagaagg ctgcccaaga cacgagactt 420
ttaccaagct tgaacttana aaagaaagct cgtcttgaaa gangaagcnc tntgaaggcc 480
aaaacagagt acanaagttt ccnngttggc ttggattttg aaaattcnng aattntntat 540
aacgggcttn tttaaaaagg atnggnttan gnacctttnt taaat 585

<210> 77
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 77
ggtacgcggg agtcatattt atgaaaaaag gtttgtgttt tactcttgct agtgagaaag 60
tgggacaaaa tatacttttg aaataaaatg ctatatggca cctaattatt ttttctttta 120
aaatgcctta agttgcagtc tcattttgat aatcatttgc ttccagtgtt taaaaattaa 180
aaaaagaatg gggagaaggt tatgagaaga gcattattaa gtttccaaat ttaatttgaa 240
ttccaaattc acctagcaat aaaatctaat ttttaaaaag tatataaata taaaatgtat 300
aaatgatgga tagatttttg tattgatttg caaatgcag attatatttg ataggctata 360
gtatgtagat attcctttta ggaatattac agctgtaaat tatatgagac ttgccagtca 420
aatgctattt ggtttaaaaa aattattgca atctcaagtt aatggaatat ttttaaatcc 480
cacattcaga gttaaaacct ngttttcaat gggtttttan tgtggcactt gnttatagat 540
taatttttaa taacctgttn ggaancnggg ccttttaact ggtccttggg g 591

<210> 78
<211> 252
<212> DNA
<213> Homo sapiens

<400> 78
actgagaagt attttcagtg attcgaccca gaccagattt caacacatgg ttcccataca 60
ggaaggactg ctctgcacca ggctttatcc aaactttata cttggcataa ggtgcaaggt 120
aatccagagc tgtgacgtgc aaccgaaact tgtgggtttt agtgaatttt ccaaagcagg 180
tccccagcga caccagcttg tccccggaaa tattggcggc cagcttcata atcttctcac 240
tcacatagta cc 252

<210> 79
<211> 571
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(571)
<223> n = A,T,C or G

<400> 79
gctcgggcaa gcactttaac cttttaagcc caaccagatg agttgcctgc agttttggag 60
gccttcagag catttcacta gacctctgtc tgtgtcggtc cagtgtcttt agccaagctt 120
tgattaaaga tgacttcctt gtttgctcaa gaaattcgcc tttctaaaag acatgaagaa 180
atagtatcac aaagattaat gttacttcaa caaatggaga ataaattggg tgatcaacac 240
acagaaaagg catctcaact ccaaactgtt gagactgctt ttaaaaggaa ccttagtctt 300
ttaaaggata tagaagcagc agaaaagtca ctacagacca ggattcaccc acttccacgg 360
cctgaggtgg tttctcttga actcgttact gggcatcagt agaagaatat attcccaaat 420
ngggacaagt tcttttagga agacccctta tccttttgct ggtgaaaatc aaaatgaagc 480
nnaaaatccc ttcaaaatga ggccaacgan taactttttt aaatggcttt tcaaaaagcc 540
ntgttaatta ancttnantg taaaggnttt t 571

<210> 80
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 80
acctcttcct gttcgaatgg gttatccagt aaaaaagggc gtgcccatgg caaaggaggg 60
aaatctagaa cttttaaaga ttcccaattt tctgcatttg actcctgtag caattaaaaa 120
gcactgtgaa gcccttaaag atttttgcac tgagtggcca gccgcactgg acagtgacga 180
gaaatgtgag aagcattttc caattgaaat tgacagcact gattatgttt catcaggacc 240
atctgttcgg aaccccagag cacgagtagt agtctcaaga gtaaagcttt ccagtttgaa 300
tttagatgat cacgcaaaga agaaattaat taaacttgta ggagagcgat actgcaagac 360
cacagatgtg cttaccatca aaacagatag gtgcccttta aggaggcaga attaccatta 420
tgccagtgta tctactaaca gtgttatatc atgagtcttg gaatactgaa gaatgggaaa 480
aaagttagac tgaagccgac ttggagaatn tatatgggaa aatactatca gaaagaaata 540
tctggnaacc cttttccgat gaaagtgctg anaaaatntg gaattaataa gaagn 595

<210> 81
<211> 601
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(601)
<223> n = A,T,C or G

<400> 81
acgcggggga aaacaagatg gaggattcgg cctcggcctc gctgtcttct gcagccgcta 60
ctggaacctc cacctcgact ccagcggccc cgacagcacg gaagcagctg gataaagaac 120

aggttagaaa ggcagtggac gctctcttga cgcattgcaa gtccaggaaa aacaattatg 180
ggttgctttt gaatgagaat gaaagtttat ttttaatggt ggtattatgg aaaattccaa 240
gtaaagaact gagggtcaga ttgaccttgc ctcatagtat tcgatcagat tcagaagata 300
tctgtttatt tacgaaggat gaacccaatt caactcctga aaagacagaa cagttttata 360
gaaagctttt aaacaagcat ggaattaaaa ccgtttctca gattatctnc cttcaaactc 420
taaagaanga atataaatcc tatgaagccc aacttccgnc ttctgagcag ttttgaattc 480
ttncttactg atgccagaat tangcngntc ttacccttac tcattgggag acatttctat 540
caaagaaaga aagttcagta tctgtaaacc ntttgtccaa gaatttttca ggagagatca 600
a 601

<210> 82
<211> 606
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(606)
<223> n = A,T,C or G

<400> 82
cgaggtactt tgaatatgga gtagtttaca gctatttttt tttcttactg gtaatcttaa 60
ctaatatgat tcccttatta gagagcctct cactccccca cccccaaaaa tgtctactat 120
tcatgacagt aaccaattat tctggacaaa ttgcttcttt ttaatttgag ctatctgcca 180
tggactttct aaaatggaaa cacagcctga gtgtatctta gggagagttt gattgaaaaa 240
atccaaatca ctatccatat agatcatgga tataaagaga tacctgattt ttattaaaaa 300
gatacttttt caaatttaag agttaatctt ggaaatttgg aacaagtaaa ggggcaagta 360
aacctttga tgaaatataa aaggactcat tgcatgaagt gactatcaaa ttctgngatg 420
tgnggcttct taaaaatatt ctcagggctt tgggggcctg ccanatggta cctgcccggc 480
ggccgtcaaa agggcgaatt ccncacactg ggggccgtac taggggtcc caacttggac 540
ccaacctggn gnaaataang gcataantgg tccnggggga aatggtnncc gttccattnc 600
cccann 606

<210> 83
<211> 613
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(613)
<223> n = A,T,C or G

<400> 83
gcgtggtcgg gccgaggtac acgttcgtca tggcggctgg ccctggacct gggtaggggg 60
tccgggttca gtggtaatag cggcggagat gggggagcct ccgcttggct tctttcacac 120
gggttgcttc ggaggaatcc gccgtgcaaa tctgtccgcc cccttggcca ctgatccccc 180
gaagagcttc tgtcgccgct ctaggaatac agacattgaa gtttgggaca agatatttat 240
ctaacttctg tgtcaaaatt agcgacctgc tatggcaatg aagaaagaaa ctgaatttgt 300
cattttcacc tgaagaaaaa tgatagacaa aaatcaaacc tgtggtgtag gacaggattc 360
tgtgccctat atgatttgct gattcacata ctcgaagaat ggtttggtgt ggaacanttg 420
gaggactatt tgaattttgc aaactatctc ttgngggttt tacaccacta atacttttaa 480
tacttcctta ctttactatc tttcttctct accttactaa taatttctta cacattatta 540

agaagaaaga tgttttgaaa gaagcctact ntcataatta tnggatggtn caagggaaac 600
anggcactnt ntg 613

<210> 84
<211> 605
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(605)
<223> n = A,T,C or G

<400> 84
ggtactatct gctgctggca aatggggttg ctctgggtga cagggatctg ctgacccaat 60
gctatggttt gttccagtca atgagttgag aaggctaaag ccttggttcc tatcattctt 120
catcactaca ttggaccaca cattggcatt cagggcttgg acaattcgct ttactcctgt 180
agattctggg aagtcatcat cctcctcagg caactcctct ggactaagtt ctaccaattc 240
aaagccatgt ttgaggcacc attcttgagc tttttgtcgg tttataccat cttcagacac 300
tctatcgcag accaagatca tcacctcagg taaccatgct tttgccagtg gaagccatga 360
ggagacacta tcaaggcccg atttttgtgt gctgtcaaag taaaccacaa atgcttggac 420
agattctgca atctctgcag taaccagaaa tttgttgggc accccacata gattgagtct 480
gctgaaaagt atttattatc aatggncccn ggataaaact acacattatt tggaagtact 540
ttcncaataa gaacttntgg tccaaggtat ttttggaccn aanggnctct tgaaaaaacg 600
gagga 605

<210> 85
<211> 603
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(603)
<223> n = A,T,C or G

<400> 85
acagggaatg aagactcgaa gaggagatgt cactttcctg gaagatgttt taaatgagat 60
tcaattaagg atgctacaga acatggcttc aattaagaca actaaagaac tcaagaaccc 120
acaagagact gcagagaggg tcgggctcgc agcactcatt attcaggact tcaaaggttt 180
actcttatct gactacaagt tcagctggga tcgtgttttc cagagtcgcg gggacacagg 240
tagagtaaac tgcanagctg cctgtctgtg acttccaagg ctaggtcata aaaggagata 300
aagcttcttc tggctgggtg ggctgcttgc tcttgaacct tcagtctatg cacgcaacat 360
gcctttccag ccttctgtgg ttgtagagtg natagaaagc aattggatca ctatngacag 420
cggggtaaaa cttgaggaag caacctccgc caggnggtac atggaggane cctgaannaa 480
aggaanaaaa gggcacangg gcttaatcct gtcttggaat gcttncctnt gcaatggnnc 540
atttcaatgg ccnagccaat tatgccatcc ctgcnttaan accatgggcc ttcnttgnca 600
ttn 603

<210> 86
<211> 583
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(583)
<223> n = A,T,C or G

<400> 86
actgtaggta tttattaata atagcaatga agatgaaaga gtgatgtatc agagaggtgg 60
agataaaatc agtaaaactt agacactaaa tgatagggga aggtggagga gaggaatgag 120
cctagaaaac ttagaatata atggttctaa aattaaccaa agtaagggac acaggcatta 180
gagtaggttt tgcagagaat gaatgtttta agacacacac aggtgtctct gggacaacca 240
agaaaagtgc aacaggcaga tggattgagg agtctggcta aagataagga tttaggaact 300
gctgaattaa aattacccaa gcgtgagaag tggtgttgtg attaagagag aaaaaaaaaa 360
tggaggtctg aggaatacct ttaanggatt aatgaanang cccaaaggtg ggggggtggt 420
caggagtgac ccaaatgtag aagtcaggga ataaacttta aagtngggt gtcaaaatgc 480
naatccgaaa aaaagtnagt nccttggccg gaccccctag gcgaatccac ccctggngcc 540
gtctanggat ccacttgncc aacttgggaa nntggctnct ttt 583

<210> 87
<211> 332
<212> DNA
<213> Homo sapiens

<400> 87
acgcgggggc attgctagaa gccggcagga gtgactctcg gcatggagga cccatctcct 60
agcacacgtg cccactgaag tggcaccaac agaagtttgg cttgaactaa aggacatttt 120
atttttttta ctttagcaca taatttgtat atttgaaaat aatatatatt attttaccta 180
ttagattctg atttgatata caaaggacta agatattttc ttcttgaaga gacttttcga 240
ttagtcctca tatatttatc tactaaaata gagtgtttac catgaacagt gtgttgcttc 300
agactattac aaagacaact ggggcaggta cc 332

<210> 88
<211> 592
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(592)
<223> n = A,T,C or G

<400> 88
cgaggtacgc ggggacaacc agctgactcc cgtagaggaa gacactgtgg aggccagttc 60
tggagctatt gcagcctcgg ttgcccggcc cgggacccga acccgaaaaa gttatcgtca 120
gaatgtcggg caaagaccga attgaaatct ttccctcgcg aatggcacag accatcatga 180
aggctcgttt aaagggagca cagacaggtc gaaacctcct gaagaaaaaa tctgatgcct 240
taactcttcg atttcgacag atcctaaaga agatnataga gactaaaatg ttgatgggcc 300
aagtgatgag agaagctgcc ttttcactag ctgaagccaa gttcacagca ggtgacttca 360
gcactacagg tattccaaat gtcaataaag ccccagtgaa gattcnagcn aagaaagata 420
tgtacnagtg gtactttgnc ngtatttgaa cattccntga aggactgcng gttttnactg 480
cttgggttaa cccaagtggg gacnnnttgc ttaaattaaa gaggaatttt gcccaancnt 540
gggacttctg gnggaattac tttttggaa actttttggn accttggagn aa 592

<210> 89
<211> 630
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(630)
<223> n = A,T,C or G

<400> 89
acgcgggggt ctttgggccg gcgcgaacca tggccggcat ggtggacttc caggatgagg 60
agcaggtcaa gtcctttttg gagaacatgg aggtggagtg caactaccac tgctaccacg 120
agaaggaccc ggacggttgc tatcggctgg tggactattt ggaagggatc cggaagaatt 180
ttgatgaggc tgccaaggtg ttgaagttta actgtgaaga gaaccagcac agtgatagct 240
gctacaaact gggggcctac tatgtgactg gaaaaggtgg tctgacccaa gacctgaaag 300
ctgccccagg tgctttttga tggcgtgtga gaaacctgga aagaaatcaa tagcancatg 360
tcacaacgtt ggccttctgg cacatgatgg acagggtaat gaagatggcn acctgacttt 420
ggaaaaggca aggactacta ccaaaggcct gngatggngg ntatctttca gtgcttnaaa 480
cctaatgcat ttttcttcag ggggcccaag ctttccaagg acatggcctt gcctgtnaat 540
cttcattaaa gccttgacct ggtcatattt ggccttgcca tgcaatccat ttacttggcc 600
ggacacctan gggaatcacc actggggcgt 630

<210> 90
<211> 653
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(653)
<223> n = A,T,C or G

<400> 90
ggtaccactt cactccagcc tggcgacaga gtggaactcc gtctcaaaaa ataaaataaa 60
ataaaataaa gcaaaaatat aaaatgttaa aaaaaaaaca aaaaaaggga aaaaggaagc 120
tgattgcctt ggtgagtcaa cactgggtat tttctgacca ctatttgaaa caaaaaagga 180
aaccactgat attctatgca aagatctgtt cctggaaggc actctgcgga gacaccagga 240
gaacttttat caatccttca ttgatttgaa gtaaaagtgc taaagcaatg gttggtgggt 300
ggcaacccat tagcagatca caaaatcact gtagtgggta actaaacaag aggaaacaca 360
agacggcatc ctgtgtaact ggggttaagc attactctct gaaactcatg gcatcagttt 420
cctcttaggc tcttcccaca aagtataatc atgttcattt cagtttacaa tcccttgcag 480
tcccatcgat ttgtgagaat atcccaagtc atncacagng gagnctggaa atggtcntan 540
ttgtcctgcc cggcngccgt tcnaanggcg aattcaacac actggcngcc gttctaatgg 600
atccaactcg naccaacctg gnggaacatg gctactggtt ctggngnaaa tgn 653

<210> 91
<211> 657
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature

<222> (1)...(657)
<223> n = A,T,C or G

<400> 91
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actttttttt tttttttttt ttttttttg ggagaaaagc ctnactccgt tgcccacgtt 60
ggagtgcagt ggcgtggnca tagcttattg catgcagcct naacctccca ggctnaagca 120
atnctccnac ctnnncgtgc tgnnttnntg gaactacnca tncacncnat tatgcccanc 180
tngtngttgt naatttaaag tganaccatg cncncaggnn gnatggcntt nnntancnan 240
catgcatgct cagctgtgta gtgcacgcac aggataaatg gaagggggat ttgatcaggg 300
tttttgtcac atnagcattn naaatccgna ngactgccnt gtgtctgcct ttgnaagggc 360
ctgggagtat tctgtgtagc ctttgnaaat aagggnaaaa tgngcncctg ccaaagaagt 420
cnttgctact ntgggtgngt caaaatntcc ctgtaacttg tcaatggnca caagcttggn 480
ggngtntttg ggntcttggn tgtcnttttn acgtctattg nccatgtggt tcctatatga 540
cacantcctc ntnataatcc ntganaattg ctaanntgcn cttttttttt ttttnanatt 600
nattttgctn ttaaantagc ttaanncttt ntttatcctn gggcanccna anncaat 657
```

<210> 92
<211> 653
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(653)
<223> n = A,T,C or G

<400> 92
```
accataaaac cattaaaagc aataaataac tagagtcatg tgagatgttt caaagactgc 60
tggaggtttc tgtaaaccag ggtaatcaga aatattaccc ttgtagatag ccctctcata 120
ccagtaaata caaagagtta aaattccaat gccacagtgt aacagttaac aatctatttt 180
gtaattttaa atattactac attaattcac cctgagaata cagaggaaac atttaataca 240
agacattctg atatgntttt ttttcccatt gnatttgctt tcttctggnt ttcatcagcc 300
ctttaagggc acagatattt taatttaaag ggtgatttgg atatgctttt ttggtaactg 360
agatttatgc cacagtcaga tactggtgat agaaaagccc aaaaaggntt gnagaaaaga 420
ggcaagcagc aatccccagg cagaaaagac ngaaagtctt gaaaaagaag aggagtaaaa 480
atttttttaa gctgntcaat gccctgtatt tgggnacaag tacctttatt ttcctttagc 540
tganggnant cagagtaacc gaattggnag nnnactattt tcnctggnaa ggaaaataga 600
atttggnaat cccnggaang gtnctngaaa tnnagcccca tccatttgnn gng 653
```

<210> 93
<211> 640
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(640)
<223> n = A,T,C or G

<400> 93
```
acagagaaac cacaggttgc cctttccaca gctggataga cttatccaaa acggcaggat 60
ggttctgtat taatcttttt ggaaagcatg tctgtattaa gattgcaaaa catacagata 120
gctaccacaa attaggtcaa acgactgatc aagttgtaac atctgtgagg tcaaattcca 180
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aagtgcctag atacacattt atacaacaga ccataagagc tgaattcttt acaaatgtct 240
ttatgggcat gtaaaattga ctctgcattt ctgcatgtgt gcattccata agagagacca 300
gtctgcactg agtcatatat actccaactt gaaaaagtaa gtgnaacaac tggntaatca 360
tgcaagtctg gttgnaatat aacaatgact ggnaaaacat gaattcttcg cacagtagta 420
ataggngcac tnatttaaaa ccctnccgaa aaacctgnat ttggtgcaan atctgantt 480
aagnggtagt aacttgacnt ttaaaaatag tttgaacnat ttanaaaggn aagccaactt 540
ttacttaaaa gaatcccaag tggnaaaanc tggntttcaa tggaatgaac tnggtgngac 600
ctnccctaat nngaccttga gcctatnagc taatntangg 640

<210> 94
<211> 658
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(658)
<223> n = A,T,C or G

<400> 94
acgcgggcca agcttttttt ttaatttggt gttttctccc atcctttccc tttaaccctc 60
agtatcaagc acaaaaattg atggactgat aaaagaacta tcttagaact cagaagaaga 120
aagaatcaaa ttcataggat aagtcaatac cttaatggtg gtagagcctt tacctgtagc 180
ttgaaagggg aaagattgga ggtaagagag aaaatgaaag aacacctctg ggtccttctg 240
tccagttttc aagcactagt cttactcagc tatccattat agttttgccc ttaagaaagt 300
catgattaac ttatgaaaaa attatttggg gacaggaatg tgataccttc cttggntttt 360
ttttgcaanc ctcaaatcct aacttcctgc cccacaatgg tgagcaggtt cccctgatac 420
ttcttttctt taatgattta actatnaact tgnataaata acttataggg gatagggaaa 480
attcctgaat tccagaatgc catctgntaa aaaagaatnn aaatggaaag tnggactnaa 540
aaggagccaa cagcatgctg cggtggnngn cacttctttg cnctatccca ggaaggaagg 600
tccccatttg gaaaggggtt cttnctcact ggnaccggtt tgacntnatt ggnacncc 658

<210> 95
<211> 392
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(392)
<223> n = A,T,C or G

<400> 95
actcagactt gatcgattaa tgaagtggtt attttggcct ttgcttgata ttatcaactc 60
actggtaaca acagtattca tgctcatcgt atctgtgttg gcactgatac cagaaaccac 120
aacattgaca gttggtggag ggtgtttgc acttgtgaca gcagtatgct gtcttgccga 180
cggggccctt atttaccgga agcttctgtt caatcccagc ggtccttacc agaaaaagcc 240
tgtgcatgaa aaaaaaagaa gttttgtaat tttatattac ttnttaagtt tgatactaag 300
tattaaacat atttctgnat tcttccaaaa aaaanaaant aatnaantta naanctttta 360
aanatanaaa taaaataata angaccattg ag 392

<210> 96
<211> 655

<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(655)
<223> n = A,T,C or G

<400> 96
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ggtacaggtt tttatgtgaa catacatttt cattttctgg gataaatgct caaaagggca    60
actgttgggt tgtatggtaa acacatatat ttttgtaaga aactacccta ctctttttcc   120
agagtggctc tactttttac atacagccac tcatacaatt cagacagcaa tgtatgattg   180
atccagtttc ttcacatcct caccagcatt tggtattact actatttttt atcttaacca   240
ttcacataga tgtgtgtaat gataccacat gtggttttaa tttgcatttc caatggctaa   300
tgatgttgag tatctttttg tgtgctaatt tgccatctat gtatcctctt cggtgaaatg   360
tcttcatgtc ttttgnctat tttctattta agncatttgg tctttttact attgagtttg   420
agagggtttt tatatatcct agataaaaat cctctggtan anatgtgggt gcctggaatt   480
ttaacataac ttctacccan ggaaaataag taaaatttcc acccttgctg gcnagcctta   540
cttaatnccg gccttaangg tccttctaga gaattaagaa gatttgaggt ttaaatanaa   600
tcagggcntt aaaaagtaat cctaaaatcn ggtttaagca agccatatcc tgggg        655
```

<210> 97
<211> 224
<212> DNA
<213> Homo sapiens

<400> 97
```
acaagtttaa ggtaggacgc agcattttat agtgttacgt ccttcctccc cacattcctg    60
tgaggcggaa caagaacaat tacttgaccc tggaggaaga cgacgccttg tggtcaggga   120
gagaacagca gttcatgctg gctgcctcgt ctttccaggc ctgctgctgc ccaggcttct   180
actgaccttg ttaggtctga ttctagaaaa tgaaggcagg tacc                    224
```

<210> 98
<211> 582
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(582)
<223> n = A,T,C or G

<400> 98
```
ggtaccacca tgcctggttt attgttttat ttttttggca gagatgggtc tcactgtgtt    60
gcccaggctg atctcaaact cctggcctca agcgatcctc ccatctcagc ctcccaaagt   120
gctgggatta cagacctgag ccaccacacc tgggcaacag agtgaaacct gtccctgttt   180
tcctgctctt actctcacct ctgaggcctc ctctgcctgg aagagattac agggaaattc   240
caggcagccc ttgtcaattg tttttatgaa ttctttacct gttcctttta aagacaagga   300
aactgaggcc caaagttcta agttgtttgg caaatggagt ctcctaccct cagctcctgc   360
aaggacctgg gggaccccca ggtccagcag ccacatgatt ctgcacagac agggacctag   420
agcacatctg gatttaagcc caccctggca actggctgct agagactncc aagatgccga   480
taataggatc tgccnttaaa aaatctggat tctggcctgc ntaantgcta cttcatttgg   540
ctacaaagnt ttaaggngga accnttaaaa ccttccccaa aa                      582
```

<210> 99
<211> 619
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(619)
<223> n = A,T,C or G

<400> 99
ggtacagtgg tccttttcag agttggactt ctagactcac ctgttctcac tccctgtttt 60
aattcaaccc agccatgcaa tgccaaataa tagaattgct ccctaccagc tgaacaggga 120
ggagtctgtg cagtttctga cacttgttgt tgaacatggc taaatacaat gggtatcgct 180
gagactaagt tgtagaaatt aacaaatgtg ctgcttggtt aaaatggcta cactcatctg 240
actcattctt tattctattt tagttggttt gtatcttgcc taaggtgcgt agtccaactc 300
ttggtattac cctcctaata gtcatactag tagtcatact ccctggtgta gtgtattctc 360
taaaagcttt aaatgtctgc atgcagccag ccatcaaata gtgaatggtc tctctttggc 420
tggaattaca aaactcagag aaaatgtgcc catcangaga acatcataac ccatggaagg 480
atnaaagccc caaatggngg naactgataa tagccctaat ggctttaaga atttgggcac 540
actnttacct aggngaaccc atttganccn anggggctta aaggcttntt acttcaactg 600
aaagttnagg gaaaaaaan 619

<210> 100
<211> 614
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(614)
<223> n = A,T,C or G

<400> 100
acgcggggga agcaaaggag agggaagctg gaagcacctt tggcccggga cagaaatctg 60
gagagcttgg ctacctccat cctcctcagg ccggagcagg cttcctgaga gagtccaggt 120
cgtaggagtt ttacgactta gaaaagcggg ctgcagattc cttcctgggt gtttggttca 180
agccctggct ccagcctcac tctcagtctt cccgggagtt cgtgggattt ggaccttaga 240
ttattagtat tattttgagg gcctcctgtg tgtaagcact ggttgtgcgc agatggctgt 300
gcagagggcc atgaggtaga ggctggggaa atgagggctt ggaggtgctt gaggtatggt 360
ctttacctac gtgaaatgtt ggaggttgag atgaaaactc ttgctttgaa atcttcatgg 420
aggactacat catttcaatc ctgaatctgg ctcaattcta ttaatcactt aatacctgga 480
ttaaaaaacg nttaantggg ccaggcncaa tgggtcacgc ctgnaatccc agccntttgg 540
gaggccaagg cangccggat acnttagggc ngnanttnaa accancttgg caaattggga 600
aacccgcntt tntn 614

<210> 101
<211> 625
<212> DNA
<213> Homo sapiens

<220>

<221> misc_feature
<222> (1)...(625)
<223> n = A,T,C or G

<400> 101
ggtactttgc ctacggcagc aacctgctga cagagaggat ccacctccga aacccctcgg 60
cggcgttctt ctgtgtggcc cgcctgcagg caagaagggg ttaaaagtgg aatgtatgtt 120
gtaatagaag ttaaagttgc gactcaagaa ggaaaagaaa taacctgtcg aagttatctg 180
atgacaaatt acgaaagtgc tcccnnatcc ccacagtata aaaagattat ttgcatgggt 240
gcaaaagaaa atggtttgcc gntggagtat caagagaagt taaaagcaat agaaccaaat 300
gactatacag gaaaggtctc agaagaaatt gaaagacatc atcaaaaagg ggnaaacaca 360
aactctttag aaccatancn gaatatatct taagggtatt cctatgtgcc taatataata 420
tatttttaac acttgagaac cagggatttt gggggattct ccaacgtttg ttcaatttta 480
agaantggtt tgaaggagtt ttttacttgg gtnattcntg gttttaggat tttnnanngn 540
aanntggntt nggngtttgn nnttttaann gggntntttt ngggtcttna aatttttcca 600
anaaanngtn gnttccttcc cggnn 625

<210> 102
<211> 605
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(605)
<223> n = A,T,C or G

<400> 102
ggtacaagaa agaaaaaata taaaaacaag tctgctgagt gtcgggagtt ggtgagggat 60
atcctaccat attgtgacgg agtccaaata gaaaacatgc agcaacagtt ctcctgcttt 120
atcagctccc tggaaaataa accagtaacc ctggtagtgc agtaaccatt tggttaacag 180
gacaaacttc ctgatggaca cagatagtaa ttcactgcat ttcccttctc taacttctct 240
cttcacacca attccttttc tttcctttaa gatgggtttc atcctgttga caaaagattt 300
ggttttattt gtaaagtaaa gcagataata tcctgattga agtattcaat gatttaattg 360
aggatgcttg gggatcaaac tttgtaaaaa ggtcaattaa gctagttagc agagactatc 420
agtggcttgc agaaaaaaaa ntcngatata tggtttggta aaangcccaa aggataaccg 480
ngaaaaatcc tanggatacc gggacctaat taatcaaagc canaggggga ccttggttaa 540
ancnttact tnggggangg gctnaanggn ggntccaaac naaattggtt cccaacgggc 600
ccggg 605

<210> 103
<211> 251
<212> DNA
<213> Homo sapiens

<400> 103
acgcgggatt ttacattcca tcttttctga agattgtcct acaatttgga ttttgatcat 60
gacaaagaag attaaaattt cattagcatg aatgcaattt gttaaagcag actgatttgt 120
ttctaagata tttttggttt ttttaaaact gataataatg ctgaattatc ttaagtgaga 180
tgttaagccc actttgttct tttaatgtaa tggagcttat gggtagaaga ccatgtctac 240
taattacaaa a 251

<210> 104

<211> 293
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(293)
<223> n = A,T,C or G

<400> 104
ttaatcttgc acaaatggca ttttattaaa gaaaatctaa tttacaaagc tttgtaaatt 60
ttaagaaaaa cattcataga tcataaacaa aaatttcaat atgcaatatt caaatttaca 120
agaaaataag cacaaacttt tagacagtgc agttattgct gcactccttt aattccttat 180
ccagagccca aaaaatgtag acaaacccta aaaatgtagc agaagcattt ccgcacactg 240
gtgtccagaa tctagtttgt gcanaaatgt ttccactaga tttatagagt acc 293

<210> 105
<211> 586
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(586)
<223> n = A,T,C or G

<400> 105
acatcatttc tgccatgtgg gacattttct tgggaatata caagtaatac tccatgtagc 60
ctgacaggtc ctcaatggtc acatcatcca cgaagactcg agcttgctca gaacaggatc 120
ggggagagcc agacagagtt ctggcgtgca gcgactgaga gtagtcctca agtgtggatc 180
ttcgttctgg agccaaggga gggacactct gcgggcctga aaaggaatac acttccatat 240
catgccatct cttacactgg cattccttgc ctatgcatgt gcatggcttg ccctggttta 300
gcttggaaac tgattgaaag tcagagagat cactggcttt gagacttgct tgggggactt 360
gggtagccgt cagaggagtc ttccttctta ctctctgatg ggagccttgg aacagaaagt 420
tctcaaangc tnaacgactg gccctggggt gaatagcatc gagagaagta naccttcttc 480
ctgnactgaa ctnttaaggg gatgaaattc ccagccaatg gtggccttan gnnangcaan 540
ntggcttttg gcttgaatta ctggntggaa aaaacctttg gccntt 586

<210> 106
<211> 644
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(644)
<223> n = A,T,C or G

<400> 106
ggtacnttga ttgctcanat ataangaaat ggcccaatga acgtggntgn gggaggggaa 60
anangaaaca gagctagnca tatgtgaatt gntctgtgnn ataaacatgt taaaacanac 120
aaanatggnt atttttcttt ncctccggac agtgcacatt atcatntgaa ctacctgggg 180
attctntatc anaactggtc ttgttgaata tttatactta attgaaataa ttccttanng 240

gaggcntgtt taaaacgtat taacaggana ttgtgtntna nacatttaat gaaanacgaa 300
attccacnag aatganntaa gtcactttcc aagtgggtgt cattttgtta aaccctngtt 360
tacctgtttt gctattntta ccntttcatt tggaangatg ntttgagntc gtanttacca 420
gggnaaagac gggttncttc ctngctgnnn cttnagccnn tgctaaaaag cnttaatttt 480
ntgcnattng gnncttcctg ctggtaatcn tggaaaaant gggnnaantc cagctttntt 540
tnttggcngc ccaaaaangg attcnnantn gnnannnaac ctttggttcc ntaannaana 600
aaangtatnc anaangaacc ttgncatgcc ngccnntnta aang 644

<210> 107
<211> 618
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(618)
<223> n = A,T,C or G

<400> 107
ggtacagact tgccctttga aatctatacc tctggataca ttagaggcat tttattaaca 60
aaggcccttc taaatgtgct atttatttga caataactat cagatttgcc ttaattttgt 120
gtttatagca tttatcaaaa cgtatcctca tagactttat gcagattaat atggtcaatt 180
gatttggata aaagaaagta atttcagggt ttgtttttaa gccaggacaa gaagtgcaaa 240
tgcctctttg aagcaattta ggctaaactg attttgaaat ttcaaaatgt tttattttac 300
tttgttttat taagccagga caagaagtgc aaatgccctc ttttgaagca attcaggcta 360
ggtaaacccg atttggcca tttcaaaacc gtttaattta ctttggttta atatcagagt 420
cttataaaac tgntgncaaa aatttctgaa ggctttngaa aagggttggt agtggaccct 480
gcccgggcgg ccgntcnaag gcgaattcag ccactggcgg ncgtactagg gatnccactc 540
ggacccanct tggcggaatc atgggcataa ctggttcctg ngtgaaatgg gatccgttac 600
aattcccaca acatanng 618

<210> 108
<211> 620
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(620)
<223> n = A,T,C or G

<400> 108
ggtaccaaag gagaatttgg agagctggct aaattatttg aagaaagaat tgccaacagt 60
ggtgttcaga gcctcaacaa aaccaaagga taaagggaag ataaccaagc gtgtgaaggc 120
aaagaagaat gctgctccat tcagaagtga agtctgcttt gggaaagagg gcctttggaa 180
acttcttgga ggttttcagg aaacttgcag caaagccatt cgggttggag taattggttt 240
cccaaatgtg gggaaaagca gcattatcaa tagcttaaaa caagaacaga tgtgtaatgt 300
tggtgtatcc atggggctta caaggagcat gcaagttgtc ccctttggac aaacagatca 360
caatcataga tagccccgac cttcatcgaa tctncactta attccttctt tgngccttgn 420
ttttgcnaag ttcanccaag gttttgaagt antaaaancc gatggaagct tgccantgcc 480
atcctttcca agcttgatgc ttgacaggta gtancttgnc cgggccggcc gttcnaaagg 540
gcgaattcaa cacactggcn gccgtactat ggatccgagc ttggnccaaa cttgcgtaat 600
catggcatnc tggttcctgg 620

<210> 109
<211> 317
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(317)
<223> n = A,T,C or G

<400> 109
tttgtatttt tagtagaggc agtgtttcac cgtgttagcc aggatggtct cgatctcctg 60
acctcgtgat ccacccacct cgacctccca aagtgctggg attacaggcg tgagccacca 120
cgcccggcct cttttttttt tagctgccaa tctttttgaa ggaatattct tacctctact 180
ttgtcacctt ctactggctc cttaactaaa atctgccatt tggctctctg gttaacagtc 240
ccttcctgta aagtctaaaa tcttaattct aaatccacag tttaattcac aagctagtac 300
cttggccgng accacgc 317

<210> 110
<211> 603
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(603)
<223> n = A,T,C or G

<400> 110
ggtacattca ggatccctcg gccaaggact ggaccagaag aacacttggg aatcttgggt 60
ccacttatca aaggtgaagt tggtgatatc ctgactgtgg tattcaagaa taatgccagc 120
cgcccctact ctgtgcatgc tcatggagtg ctagaatcta ctactgtctg gccactggct 180
gctgagcctg gtgaggtggt cacttatcag tggaacatcc cagagaggtc tggccctggg 240
cccaatgact ctgcttgtgt ttcctggatc tattattctg cagtggatcc catcaaggac 300
atgtatagtg gcctggtggg gcccttggct atctgccaaa agggcatcct ggaaccccat 360
ggaagaccga gtgacctgga tcnggaattt gcattggtgg tcctgaattt tgatgaaaat 420
aancctggna tttggaagga aatgtgcaac catgggtcca agaatccagc cnnattaacc 480
taccggatga acctttnttg gaaaccataa aatgcctgca atcaatggga actttttcca 540
accttanggg cttaccatga ccttgcccgg ccggccnttt aaanggccaa ttccaccccc 600
tgg 603

<210> 111
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 111

```
acatttaagt tcccatgtta cagaatccca tattgtgact atttcctcaa aactaactgc      60
tagtaaagaa ccatcttcgg agaaacaaca gttagttgct tgatacttgt gataactacc     120
aacaaagtca caggtccagc caacagcttt tttgtatatg tcagagtcat ctgttaatat     180
ccatactttg aagtaaccat ctttgctagc tgtaaccaag gtgggctgtt cagatttttc     240
tgcattacag aaacagagag ctgtaatgca gtcttcgtgt ggcatgttaa ttttagtgtt     300
aagaataaac ccttgtgttt tcttattata catccacagt ttcatttgca attcaagctc     360
aagtttcctt ttcttgccgc tggtccactg gtgcaagcca gttaccaaag cagccaatgc     420
aagccttggt aagtcaattt ggatcaganc ataatcanta atatatcctg ctggataata     480
ctaaattgga tactggntat cactntggag agaataaact gcaggtggcn ggntttcatt     540
caaaccaagc tttagtcttg gacaatcatn aaccagngaa atactcctat ntttn          595
```

<210> 112
<211> 523
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(523)
<223> n = A,T,C or G

<400> 112

```
acaagagcta ttagagatgc tgccatatgg atgggcaaaa ctgagccaat cccacttagg      60
aatggaaggc ttggacatgg aagggaggat ataaacgagg agttggagaa aaacgcaagc     120
ccagtttttg ctagagtgga aatgaaagtg ggaatgaggg tcttgttttt agtcctctaa     180
ggaccaggaa gcaattttaa aacttccttg gtttttctga aagcagcata ttcaaaatgc     240
cagcaaaaac tcctaacaac tgcaaaacca aaagaggatc aaagctcacc aacatccctt     300
cttattgctg aaaggctcta aaattcagga tgccctgttc ccttgtaaaa gggaaaataa     360
ttaaagtctg atttatggta atcataccac atcacacttc taaaaaaata tttcaagtgt     420
gtgaccaggg gaccgtttga ccnccatttt attaaccttc actttantgg gaaaaataaa     480
accttttcca gggccatttn atnccaggac ttttagtagg ggg                       523
```

<210> 113
<211> 578
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(578)
<223> n = A,T,C or G

<400> 113

```
acagtgtaaa taactaagtt gttaactgtc aagtccagtt atgtattctg taagttgtgt      60
tctagtcttt gactaaaatt tatcatctct tataatggga cttaatcttt ctctaaaagc     120
atataagagc ttgtcaatag agcaatcaat caaaaagatt ttgtgattca taacattgaa     180
gttagtctgg ttaagagttt tggtttagac ttcatttata ttttccttac taatatctaa     240
tatttaatga ataatgatca attttttata aagttattaa tatgatcagg gaaacctttg     300
ggacttctga caggcatctg gtgaagagac aattcaagcc ttagtgacta tttagaatag     360
ccagtgatca ctagctaatt ctcatatcca tgcctttttt gccctggtta cagtcttaaa     420
agaggtaaaa cagcaaatat tttttttaag ggaactataa ccctangaat tcctgaaaag     480
aatttcaaaa aaaataagac cctgtggcca tggngnccaa acntaagacc tactatggct     540
atattggtcc attaaaaata aattactact aatccaaa                             578
```

<210> 114
<211> 613
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(613)
<223> n = A,T,C or G

<400> 114
acggtagtaa gaaacctttg agatctttct gacttttcaa aattagagaa agcaaatggg 60
atggatagat tttttttttc ttttcaaggg gggcaggaag gtaatggttt gagtagcctt 120
tgtttaaaaa aaaactaaat atatttaaaa ggccacattt atattttttt cacaagaacc 180
acataataaa ttccacttct tgacctgaat ttggaaatcc gaaattacta atccaggcca 240
ggtgtggtgg ctcatgcctg taatcccagc actttgagag gccgaggtgg gcagatcact 300
tgaggcctgg agttcaagac caccttggcg aacacggtga aaccccgtct ctacgaaaaa 360
aaaaanatat aaaaaaagta ctggttatta accaaccagc ttagaaaaat aatcatggtn 420
gacacnttan ttcattcttc taaaagcctg ttgatctggg ccttcctgtt gccagcattt 480
ccccttttc aaaaatgggg ggccttttct ttaattnnac ctcgtggngn aananaattt 540
gaagggcccc aggaagttnt ttgggcnctt tgaagcgttt tncacncgtn tagattctnt 600
gattaaatcc tcc 613

<210> 115
<211> 190
<212> DNA
<213> Homo sapiens

<400> 115
ggtacattgc cactgagtaa agagtggcac cagccacggt ggtaggtgga agaaacatag 60
atcccaatga ggacacaaag acgagaccca ggcccactcc caggggtgca cccatgttca 120
gaaacttttc actgggcgca cacatggcca cagtggagag gcctcccaca atgccagctg 180
tgtacttttt 190

<210> 116
<211> 610
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(610)
<223> n = A,T,C or G

<400> 116
ggtactcttg gtttatcaat gggacgttcc agcaatccac acaagagctc tttatcccca 60
acatcactgt gaataatagc ggatcctata tgtgccaagc ccataactca gccactggcc 120
tcaataggac cacagtcacg atgatcacag tctctggaag tgctcctgtc ctctcagctg 180
tggccaccgt cggcatcacg attggagtgc tggccagggt ggctctgata tagcagccct 240
ggtgtatttt cgatatttca ggaagactgg cagattggac cagaccctga attcttctag 300
ctcctncaat cccattttat cccatggaac cactaaaaac aaggtctgct ctgctcctga 360
gccctatatg ctggagatgg acaactcaat gaaaatttaa agggaaaacc cttangcctg 420

aaggtgtgtg ccacttcaga gactttacct taacttgaga cngntcaaac ttgcaaacca 480
tggngnggaa atttgccgaa ctttacactt tgggcaggtt ttttcccaga agtcanaaca 540
agaactcctn ntcttganaa gggttttanc ccctttnaat ggccttgctt atgctgcctt 600
tttcgtttgg 610

<210> 117
<211> 608
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(608)
<223> n = A,T,C or G

<400> 117
ggtacgcggg ggtattatt tgtgccaacc aatgatgctt ttaagggaat gactagtgaa 60
gaaaaagaaa ttctgatacg ggacaaaaat gctcttcaaa acatcattct ttatcacctg 120
acaccaggag ttttcattgg aaaaggattt gaacctggtg ttactaacat tttatcacctg 180
acacaaggaa gcaaaatctt tctgaaagaa gtaaatgata cacttctggt gaatgaattg 240
aaatcaaaag aatctgacat catgacaaca aatggtgtaa ttcatgttgt agataaactc 300
ctctatccag cagacacacc tgttggaaat gatcaactgc tggaaatact taataaatta 360
atcaaatcat ccaaattaag tttgttcgtg gtagcacctt caaagaaaat ccccgtgact 420
gctatagacc cacactaacc aaaggtcaaa attgaaaggt gacctgaatt cagactggat 480
taaagaaagg tgaaaccatt actgaaagtg gatncatggg gaagccattt tttaaaaaat 540
nccccaaanc attgatggga attccttnng gaaatacttg aaaggaaccn nnnnagacca 600
atcnttcc 608

<210> 118
<211> 578
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(578)
<223> n = A,T,C or G

<400> 118
actccactta gcaaatgccc tgccagcaaa gtcacagatg acttttttac ccaatcttag 60
gtaaatctgg attatctgcc caaccgtgca agtcaataag ccacccttga aaactgtgtc 120
aagatttgag gaaacaggtc ttaagaacct atccaacaca tgattccata accaatacat 180
cttangttgt tttaggcaaa taggtgtatc tcttgaatca ctgatggatt caatatcaag 240
atctataatt ttcacgttta aaatttactc tgccgaggac attttattgg taaagcataa 300
accagttagt ttgacagaca cnaaaaagaa aacnaaatgt tcacagtcct atcttcgtag 360
ggattcttgg ctataaaaat tggcttcagg ttcaaggtct tagaccactc ttctaaggct 420
nctactggat atantantta ccacttgggg nccaaactta aaacctcntg gacttttcc 480
ccttanggac nangaaaaac caaggggttg tggtttgaac tccntacact tggngnnaaa 540
ncttttcttg gnngnatnta aanattaagg ggcttttn 578

<210> 119
<211> 584
<212> DNA

<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(584)
<223> n = A,T,C or G

<400> 119
actgtcttag aatattattt attttttgt atttgtaaat ctgtggacaa aagagggttt 60
cctcactcct tttactcact gggctcatga cagtgaagga gatgctccat ctgcttctcc 120
ccctttctct tgctgtagtc caatgtgcta tgagcatcag cttactttgc cacttagagc 180
aagcaaaacc cagtgcaaga gtctcgttca gctctaaata ggtttgcttt cttttagtta 240
cagtgcccat tttgaaattg cctatacagt cttagtgacc atttaaaccg gacgaactan 300
gcgtttaatt ttcacttctt catgttnaat tngcagttca anatttatag naagatggnt 360
atttcgaaaa nacaaaaaan tggnttttta anaaaanaag tncnttggtc ggcgaancan 420
gcntaagggg cgaatttcca gcncaactgg gcnggcccgt nncntagngg atccccaacc 480
tttggtaccc angcttnggc nntaancaat tggnccanag nttgtttccc tggggtgaaa 540
antngtnatc ccgttcccaa ttcccnnaca ncnnaccnng cccg 584

<210> 120
<211> 587
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(587)
<223> n = A,T,C or G

<400> 120
acgcgggggc cgtagcagcc gccgcccatc cctctttgtg tgctttggaa agccgcggag 60
ctggtggtgg ctacagttgg tgttgggggc ttaggcgagg gacgttaccg ggaagttgca 120
ggcgggagga ctcttcccca tccagtcacc tgacaggtca caaacatgtc agacaaaagt 180
gaattaaagg ctgagttgga acgtaagaag cagcgactgg cccaaatcag agaggaaaag 240
aagagaaaag aagangaagg gaaaaaaaaa gaaacagacc anaataagga agctgttgct 300
cctgtgcaag aagaatcaga tctttgaaaa aaaaaggaga gaagctnaaa gcatttgctt 360
caaagcatgg ggctaacttc agaaatcccc ccattggncc ttcctnctaa tncttncatn 420
ccttcaaaat ctgtggagcc ctttccaagg tgaaacttgn aannccaaga antntggaaa 480
atggcncccct tggggaatct agaccnaggg ncctttttna accttggaat ngnttaaaaa 540
tcacnccaag nttgactttt ccttccttcg anaaaattgg gtcccnn 587

<210> 121
<211> 570
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(570)
<223> n = A,T,C or G

<400> 121
ggtactcttg gtttatcaat gggacgttcc agcaatccac acaagagctc tttatcccca 60

acatcactgt gaataatagc ggatcctata tgtgccaagc ccataactca gccactggcc 120
tcaataggac cacagtcacg atgatcacag tctctggaag tgctcctgtc ctctcagctg 180
tggccaccgt cggcatcacg attggagtgc tggccagggt ggctctgata tagcagccct 240
ggtgtatttt cgatatttca ggaagactgg cagattggac cagaccctga attcttctag 300
ctcctncaat cccattttat cccatggaac cactaanaac aaggtctgct ctgcttctga 360
agncctatat gctggagatg gacaacttaa tgaaanattt aaangggaa aaccсttaag 420
ccttgaggtg tgtgnccact tcanaggact ttaaccttaa ctttgagacc aggtcaacct 480
ggnaanccct tggtggagaa attggccgaa cttcccnact ttggccaggn ttttcccang 540
antgtcaaan caagacttcc ttatcatgnn 570

<210> 122
<211> 551
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(551)
<223> n = A,T,C or G

<400> 122
actatctcta ttcaggatta tgaagttttt cgatgcgaag attcactgga tgaaagaaag 60
ataaaagggg tcattgagct caggaagagc ttactgtctg ccttgagaac ttatgaacca 120
tatggatccc tggttcaaca aatacgaatt ctgctgctgg gtccaattgg agctgggaag 180
tccagctttt tcaactcagt gaggtctgtt ttccaagggc atgtaacgca tcaggctttg 240
gtgggcacta atacaactgg gatatctgag aagtatagga catactctat tagagacggn 300
aaagatggca aatacctgcc cgtttattct gtgtgactca ctggggctga gtgagaaaga 360
aggcggnctg tgcagggatg acatattcta tatctttgac ggtaaccatt cgtgatagat 420
nccagtttaa ttcccatgga atcaaatcaa attaaatcat catgactacc ttggttcccc 480
atcggttgaa gggacngnat tcattggggn ggcattggat ttgatnncna gntttattca 540
atactttctc n 551

<210> 123
<211> 575
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(575)
<223> n = A,T,C or G

<400> 123
acttaataca tattttcaaa cctgtttgca tttcaaacaa agttagcgtt tttgtaaatc 60
aaatttgata acccgactaa aaatattttc cagctttatt atttaaggag ctgcacagcc 120
tttaaagtgg ggaccaggag gcaggcagag gcagagagac tgaatgcacc caggactgcg 180
cagcagtcta cagcaacatg tcccacaact ttggtgctgg aaacacaagt aatgcacaag 240
acagctgccc tccagtgtca ggatcctgtg aaacagcata tcaaaagatc gccagcttct 300
tataatttac acactttcat ttaggattgc ttttttgaag aaaaatcttt aagaatgcca 360
tttttaattt aatatccaga accctggaat ttaaaaaaac ctaatngaaa ggaaattaac 420
tggtaccatc aaaaatgggg ntgntggttg gancntgtgt gaagttaggg aattctatgg 480
cttttttttaa gatgccccgg aaaatttaac cccttaatng cangtttaat ttngaattcn 540
cnccaggtan tgtatgtnng gctcanatta gtanc 575

<210> 124
<211> 570
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(570)
<223> n = A,T,C or G

<400> 124
actgagacaa tggttagggt tgttttctta attcttttcc tggtagggca acaagaacca 60
tttccaatct agaggaaagc tccccagcat tgcttgctcc tgggcaaaca ttgctcttga 120
gttaagtgac ctaattcccc tgggagacat acgcatcaac tgtggaggtc cgaggggatg 180
agaagggata cccaccacct ttcaagggtc acaagctcac tctctgacaa gtcataatag 240
ggacactgct tctatccctc caatggagag attctggnaa cctttgaaca gcccagagct 300
tgcaanctag ccttacccaa aangactgga aangagacat atctntcaag ctttttttcag 360
gaangcgtnc ctgggaatcc aaggaacttt ttgatgctaa ttanaaangc ttgggactta 420
aaaatgtccn ctanggngtg gcacttttac angtttttgg aangcttnga aggcaganng 480
gggtcnaana ntnaaaanac nnttgacntg ntaatanngg aatantangg cnaatggaaa 540
ctgngttggg ggaggatcaa tttaaagagg 570

<210> 125
<211> 593
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(593)
<223> n = A,T,C or G

<400> 125
ggtacagaga tttaaatgaa atcttcgaaa gaataaattt gcttttcagt ccactgtatt 60
ttcaaaattg attatcacca agcttggatg aaagctgtga accacaaacc atttgtttat 120
ttaatagaaa aaagaatgtg tagattatta gcaaagtaat gccttaaaat gtatcttcac 180
acagttgaaa ttttagtata aacttgtata tcaagttgct ttccattatt tattctactt 240
taaaaatata tacaactatg atgttcaaat atgtattctg agccattatg ttcaaacata 300
aatatctggg aaattcaaac tgctgcaaca agttaggaaa ggattaagga aaaatgatga 360
gctacaaatt atgtagttgg aggaagaaaa aaatgttact tagcatttat gtctggatag 420
gtatgtattt tctaatttac atacacatat ccagttgagt atagaccacc atcaaaatgt 480
accagttaca cagagactag actaaaccac cctatttcta tacaggtacc atagtggatt 540
caaaaattta atatctcata gttcccaaaa ttattgnggn aatatgctna ttt 593

<210> 126
<211> 592
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(592)

<223> n = A,T,C or G

<400> 126
acgcgggggg gccttccggg acgagggcgc gtgggtgagg aaggtcaggt ctaggaactc 60
taactccttg ccactcaaga aatgtcctcc ctttcagaat atgccttccg catgtctcgt 120
ctcagtgccc ggctatttgg tgaagtcacc aggcctacta attccaagtc tatgaaagtg 180
gtgaaactgt ttagtgaact gcccttggcc aagaagaagg agacttatga ttggtatcca 240
aatcaccaca cttacgctga actcatgcag acgctccgat ttcttggact ctacagagat 300
gagcatcagg attttatgga tgagcaaaaa cgactaaaga agcttcgtgg aaaggagaaa 360
ccaaagaaag gagaagggaa aagagcagca aaaaggaaat agtgttggtc ccttcaagag 420
ggagactttc ttcctaatgg ccggaaagaa gaaagtgcat ttattggctt tccacatatt 480
ggaggaatgt catcttccta aatgaagttt atttggagga acacagtcat ttccttggtg 540
aaactaatcc ggtacattgn ggttgggttt ttgaacacat ctactgggca aa 592

<210> 127
<211> 600
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(600)
<223> n = A,T,C or G

<400> 127
acagtggtcc ttttcagagt tggacttcta gactcacctg ttctcactcc ctgttttaat 60
tcaacccagc catgcaatgc caaataatag aattgctccc taccagctga acagggagga 120
gtctgtgcag tttctgacac ttgttgttga acatggctaa atacaatggg tatcgctgag 180
actaagttgt agaaattaac aaatgtgctg cttggttaaa atggctacac tcatctgact 240
cattctttat tctattttag ttggtttgta tcttgcctaa ggtgcgtagt ccaactcttg 300
gtattaccct cctaatagtc atactagtag tcatactccc tggtgtagtg tattctctaa 360
aaagctttaa atgtctgcat tgcanccagc catcaaatag tgaatgggct ctcttttggc 420
ntggaattcc aaaacntcag agaaatggtg tcatcaagga gaaccttcat aaccccntga 480
anggattaaa aagccccaaa tgggggggaac tgataatagc acttaaggct ttaagaattg 540
gncacanttt caccttgtga acccattnna cnatngngcc taanngctnc ctnctncaan 600

<210> 128
<211> 588
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(588)
<223> n = A,T,C or G

<400> 128
ggtacttttt tttttttttt tttttttttt tttttttgag acggagtctc actctgtcac 60
ccaggctgga gtgcagtggc atgatcttgg ctcactgcaa gctctgcctc ctgggttcac 120
gccattctcc tgcctcagcc tcctgagtag ctgggactac aggcgtccgc caccacgccc 180
agctaatttt ttgtattttt ggtananaca gggtttcacc gngttagcca ggatggnctc 240
catctcctga cctcgtgatc tgcccacctn ggccttccaa agtgctggga ttacaggcat 300
gagccacggc gcctggccag gatggtatat ttttaactcc ttcactgggc cccacccctg 360

```
actttctgct ttangaggtc tggggtgagg ctgaanatct gggggccaca cttcgagagc    420
aaccaagact gtaagtgggg ccttccanag cccaatgaag ggaatactta ggtacaggan    480
gtgtctgcat ggncncangt gtggggtttn cttctcggcc ttaaccagaa agtatctctg    540
gttttaattt taaaatgaaa attttaaagg gtgnctgaaa cnaattgg                588
```

<210> 129
<211> 588
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(588)
<223> n = A,T,C or G

<400> 129

```
ggtactgccc tctccagatc agcagttcag gagagcacag gaggcaaaac acagattgct     60
gggcttattg gtgccatcat cgtgctgatg gtcgttctag ccattggatt tctcctggcg    120
cctctacaaa agtccgtcct ggcagcttta gcattgggaa acttaaaggg aatgctgatg    180
cagtttgctg aaataggcag attgtggcga aaggacaaat atgattgttt aatttggatc    240
atgaccttca tcttcaccat tgtcctggga ctcgggttag gcctggcagc tagtgtggca    300
tttcaactgc taaccatcgt gttcaggacc caatttccaa aatgcagcac gctggctaat    360
attggaagaa ccaacatcta taagaataaa aaagattatt atgatatgta tgagccagaa    420
ggagtgaaaa ttttcagatg tccatctcct atctactttg caaacattgg tttctttagg    480
cggaacttat cgatgctgnt ggctttagtc ccttcgaatt tacgcaagcg cacaaacttt    540
gaggaaaatc cgaaactgcn aagcaagntt gntacaagtg acccaaan                588
```

<210> 130
<211> 190
<212> DNA
<213> Homo sapiens

<400> 130

```
ggtacaaaaa aaaccttaca taaattaaga atgaatacat ttacaggcgt aaatgcaaac     60
cgcttccaat tcaaagcaag taacagccca cggtgttctg gccaaagaca tcagctaaga    120
aaggaaactg ggtcctacgg cttggacttt ccaaccctga cagacccgca agaccccgcg    180
tacttttttt                                                          190
```

<210> 131
<211> 386
<212> DNA
<213> Homo sapiens

<400> 131

```
ggtacagaac tcagaggaaa aaagaaatta aattttagct ttctggagag cagcccctct     60
ctggcaccat caaacacttc tttgtttccc ttcaacttgg aactcttcaa acatcagggg    120
ttgtgagggt ttggccattc ttttatcttg ggtccatgtg agtgacagaa atggtgcggc    180
ctgggaaaga tctccctcct ttacattttc tcttctccct cctcctcctt attctaaaac    240
tgtgcctcca acagaggggc aggggctctt gtagagagat ccctggccca ggacaggaga    300
tgccaaatct aatttatctc actgagggcc tttgagaaaa acgcttcagg gccaggctca    360
gtggctcatg cctatataat cccagt                                        386
```

<210> 132

<211> 593
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(593)
<223> n = A,T,C or G

<400> 132
actgagacaa tggttagggt tgttttctta attcttttcc tggtagggca acaagaacca 60
tttccaatct agaggaaagc tccccagcat tgcttgctcc tggcaaaca ttgctcttga 120
gttaagtgac ctaattcccc tgggagacat acgcatcaac tgtggaggtc cgaggggatg 180
agaagggata cccaccacct ttcaagggtc acaagctcac tctctgacaa gtcagaatag 240
ggacactgct tctatccctc caatggagag attctggcaa cctttgaaca gcccagagct 300
tgcaacctag cctcacccaa gaagactgga aagagacata tctctcagct ttttcaggag 360
gcgtgcctgg gaatccagga actttttgat gctaattaga aggcctggac taaaaatgtc 420
actatngggt gcactctaca gtttttgaaa tgctaggang cagaagggca aaaataaaaa 480
acatgacctg gttgaaggaa naaaagcaaa gaaacttggg ngggaggaca attaaaaaga 540
gnncctggga tcccctnttc ttaggtccct ctcttacnaa ggacnctntt tat 593

<210> 133
<211> 588
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(588)
<223> n = A,T,C or G

<400> 133
acagancatt nnnagcnctn gcacaggnta cagaacctna cagacccaaa ggaacatcgg 60
ataggcnaag cgactacagg aggcgtgtgt gcgcttgggc naggtaaaca gggtcagtat 120
tggtcnngtg acaagagnca cgaantctgg ccngacantg angtnaanaa ggttnatnnt 180
ttnacantta tnnnanatat nnnnnaannt attaanctgc ancanntgat tttnacacct 240
anttactaga aaactaanga aagcactnat tagctctgaa tnaantnaca tggnaagcct 300
tttactaatc tncaaanaaa ccttctctgc antatnnnaa agattttatn atacaangng 360
gnnnatcnct cnatcatann gggttctatt ananaaccct gctaantntg cgacttacag 420
aacanccagc ntananatga ntttcatgcc catttgggaa gcatngcccg ggtatcacaa 480
aggaaaccta ctaaagnttt ctgttatacc agccttcntt cntatcantg catgngnana 540
nanaaccntt gaaggttntc cnggggactt tnttctnttn ctttgccc 588

<210> 134
<211> 618
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(618)
<223> n = A,T,C or G

<400> 134
tcnagcggcc nnccnggcag gtacantcac annttnnang anctnaacac anactanctg 60
nngtcaaata ttnaacaaaa gcantagatg aanctgctta acattcacgg aaaaacaacc 120
aaaagaaggg aggggtgata aaccanaaaa atgantgacn aaaactaaga gacctcatan 180
gngtctttac aatcnggaat tcagatgcaa ggaacagacn caaanctgtc taaaatgtna 240
cctatgaggc nacanaaagt gacttaaagt ctggtntnan taaaaaatga caacccttat 300
cctagagagt cttacnttat ttaatccana cnttatntaa cgccncngat ttttgnttgg 360
ngctatggng ttnattttnt atcagaanga antgtgggac anatgcatta ctgnttgttn 420
aaagngcttn acagctaatt cacncccnng ggcatggtca aaaaggnaan aaccnggnca 480
tatattgntg anatgaaaaa accacntgtt aaaaaaataa ntgnagccna ntgngttttn 540
natgataacc aaatnttnac nttcagtann ngccttttan aagttggtga actccgaaat 600
ctncttttt aaaccngg 618

<210> 135
<211> 374
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(374)
<223> n = A,T,C or G

<400> 135
acttttttt ttttttttt ttttttttg gggatggagt ctcactctgt tgtccaggtt 60
ggagtgcagt ggtgtgatct cggctcactg caacctntgc ctcccaagtg attctcctgg 120
ctcancctcc tgagtagctg ggactacagg catgcactac catgcccggc taatttttgt 180
atttttagta nanacagggt ttcaccatgt tggccaggct ggtcttgatc tcctaatctc 240
aggtgatccg cctgcctcan cctcctaaag tgctgggatt acaggcatga gccactgtgt 300
ntggccaana ncactcgtaa gaaggatggc agtatcacaa aatcaagcca gagatacaga 360
gattacccgc gtcc 374

<210> 136
<211> 581
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(581)
<223> n = A,T,C or G

<400> 136
actccagcct tgctgaagct gcctcaaagg ctgatggttt ggcagttatt ggtgttttga 60
tgaaggttgg tgaggccaac ccaaagctgc agaaagtact tgatgccctc caagcaatta 120
aaaccaaggg caaacgagcc ccattcacaa attttgaccc ctctactctc cttccttcat 180
ccctggattt ctggacctac cctggctctc tgactcatcc tcctctttat gagagtgtaa 240
cttggatcat ctgtaaggag agcatcagtg tcagctcaga gcagctggca caattccgca 300
gccttctatc aaatgttgaa ggtgataacg ctgtccccat gcagcacaac aaccgccaac 360
ccaacctctg aagggcagaa caagtgagag cttcattttg atgattctga gaagaaactt 420
gtncttctca agaacacaac cctgcttctg acataatnca ataaaataat aattttaaaa 480
aataaattat ttcaatatta ncaagacaca tgccttnaat natctgtaaa ctaaaaacta 540
aaatttantc tactgnttaa tcnaanataa taatagcttc a 581

<210> 137
<211> 504
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(504)
<223> n = A,T,C or G

<400> 137
```
ttttncaaan nnaagttttt tacttccnaa aantnatggc taaggggngg gnggngggng      60
aaaaaagnaa aacaaaaaaa ccccaaaaaa atggggnggn naaaaggggg gganaaaaaa     120
ccnntntttt ntaaantntn acaaggcaag ngcnnangga aaaaaaaaan ncctgnaaaa     180
tcccccncgg nnggggnaaa natnnnggtt tccttttgnt ttnaaacccn ntnangnaag     240
gntntccccc ntnccccctna atnaaaaatt tntntnccng ggccnnaacc nccntanggg    300
naaattccac cncnctgggg gccgttanta agggatccna gctnggccca ancttggnga     360
aacatggcaa aactgttcct nnggnaaaat gtttcccctc anaattccca naaaataaaa     420
ccggaacata aagngaaaac cngggggcct aagngggncn cacnccattt attggggtgg     480
cccncgnccc tttcaaangg aaac                                            504
```

<210> 138
<211> 386
<212> DNA
<213> Homo sapiens

<400> 138
```
acaacaaata acactgtgac tccaacctca caacctgtgc gaaagtctac ctttgatgca      60
gccagtttca ttggaggaat tgtcctggtc ttgggtgtgc aggctgtaat tttctttctt     120
tataaattct gcaaatctaa agaacgaaat taccacactc tgtaaacaga cccattgaat     180
taataaggac tggtgattca tttgtgtaac tcactgaagc caaaatacta tcttttaaga     240
tgtcccacat ggaagacgct attccaggat ctttaaattt ccatggatgc atataggatg     300
tttgggagca tcatccgtga agaaaaaatc aattaaatca ttgtgttcaa caggaatatt     360
taaaataaaa aaaaaaaaaa agtacc                                          386
```

<210> 139
<211> 586
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(586)
<223> n = A,T,C or G

<400> 139
```
ggtactcaag tttataatgt ccccaaacct taagactaga aaatcatccc aagaaaaagg      60
cctatagttg gtttaatttc accctgagaa tactgtgata aaaatcaata tatttcagag     120
ctagtaagta tttaaaaatt agtgtctcaa aaaggggaca tcataaggga aatacagggt     180
ttagaggtct gagctcaagt ggtgtaagac agttctttct tcttcctcct ttaaactctt     240
cactttgctc taacacggaa gatgggggac agtgatcccg aaggtattac taaaatattg     300
cagctttcag taattatgag aagcacagat atcaccagaa aagaaagcaa tcatttggag     360
```

```
tactaagaaa cgaaacaatg ttatttggtg gtgtataatt ctacttttct agtagattac     420
tgngtggaat tctgtgaaaa atatttgaga aaangcctgt attgcataaa taaatctttg     480
tatgttgcaa aaaaaaaaaa aaaaaaaagt acctgccggc cgncccaang gcgaattcca     540
cacctgcggc cgtctagngg tccacccggt ccacttgggt atatgg                    586
```

<210> 140
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 140

```
acagggagga atttgaagta gatagaaacc gacctggatt actccggtct gaactcagat      60
cacgtaggac tttaatcgtt gaacaaacga acctttaata gcggctgcac catcgggatg     120
tccctgnacc aaccttcaag gccnaaaccc nnntggtgnn tttggnctnt aaatnaggat     180
ggccctgtnt tccntaggta acttgttccg ttggtcaagt tattggatca attgagtata     240
gtagttcgct ttgactggtg aagtcttnac cnngtccntt tngngtgggg ttttttttagg     300
naaaagnctt ttggtncatt nntgggggggg gnagggggact gaacctttat tntttccaaa   360
tncaccttaa antcagggac aanaaacatt ccaanaacca caatctttta aaaaattaac     420
tngccagtgg gaatgtttaa aaanntnaan ggtctttttt gccttggttt ttgtgggggt     480
ctctcttccc ccccctgggg ttaatttttn aagccgggac ctcncnaana cccctttttt     540
caaagggccc naaacccccc cccccnaaaa aaaaaaaaaa aaaaaaaanc n              591
```

<210> 141
<211> 592
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(592)
<223> n = A,T,C or G

<400> 141

```
ggtacacaaa ccaagacaat atcagggtga caggtgaatg aacttaaatt ctcagtcttg      60
tctattcacc aaaaaagtat actgcctgtt ttttctttaa ttattcaagg ttgatgactt     120
ttaggaacat gttttatact gtattttttta attaaagcaa gtgccttgat gtaattccat    180
gtaaatcatt gcttaaccct cttatgggat gaggatgagt tattaatgta ttgcagccta     240
ctggaaagga gggggagttg gttaatagca gatacttttc ttctagaagc ttatgtttta     300
tgctgtttat tatgtaagat cctgtatgtg tgttgagatt tagaggtttc atttgttttg     360
tctgctaata aattgttact ctaataataa ccnngnnaaa naaannnnnn nnnnnnnnnn     420
nnnannnggt ncctgcccng gcggccgctc gaaagggcga attccancca ctggcnggcg     480
gtactaaggg gatccgnctc gggncccaac ttggcgtaat atnggcatac tggttcccgg     540
gngaaatggt atncgtcaaa ttccccaaat acnaccggaa ncttaagggt aa              592
```

<210> 142
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 142
acaacacctt cattcttaat gcttcttagg gcatcacagg ttttagaaat taatgtattt 60
ttagcattcc acagtaatga tcactttcaa aaactgcaat atacatctgc atgttacact 120
gacatacaac acataagtat tttgtcacac atcaactttt agcctcaaat aatagaatac 180
aaaaagctac actggacata acaccaccga acttttgaat atccccttttt cccaattgtt 240
aacaggtagt actgggatta caggcgtgag cctctgcgcc tggccaagtg gaggttatta 300
ttaaccctat ttaacagata taaaaagaag agattagaga attttatcaa tgttcccact 360
gtcaaataga atataagcaa tgatacaaaa tgttgagtct tcatcctcta actccagatc 420
ctggtatatt gccctacatt tctatacatt aatactaact tatacactga atacaagagt 480
naaaccaact gtcngggctt aatanggnga aaatgctctt gncctaaanc accagggtgg 540
ctnggtttat tcctacatgt ggactaaaan gnaatcatct ttatggcngg aaana 595

<210> 143
<211> 620
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(620)
<223> n = A,T,C or G

<400> 143
actactcgat tgtcaacgtc aaggagtcgc aggtcgcctg gttctaggaa taatgggga 60
agtatgtagg agttgaagat tagtccgccg tagtcggtgt actcgtgtga agttggcagg 120
gacggttcct gtcatcttct tgggcttatt tggtgtgctg ttgaaggggg gagactagag 180
aaatggcagg gaacctctta tccggggcag gtaggcgcct gtgggactgg gtgcctctgg 240
cgtgcagaag cttctctctt ggtgtgccta gattgatcgg tataaggctc actctcccgc 300
cccccaaagt ggttgatcgt tggaacgaaa aaagggccat gttcggagtg tatgacaaca 360
tcgggatcct gggaaacttt gaaaagcacc ccaaagaact gatcangggg cccatatgct 420
tcgaggntgg aaanggaatg aattgcaacg ttgtattccn aaagaagaaa atggttggaa 480
gtaaaatgtt ccttatgacc tcncaacctt ataaacncat ccgtttnttt acaaccntta 540
accacatggg aagttcattn aaaaaaactg aaaactttgn aaagnttttt ttnnccttga 600
aaagggaact tacctcgccc 620

<210> 144
<211> 613
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(613)
<223> n = A,T,C or G

<400> 144
cgaggtactt tttttttttt tttttttttt ggggtcagtg gtgatatccc cctaatcaat 60

```
tctgattgng ttccttttaa tcttctctca tttctttttt attagactag atagtgattt      120
atctatttta ttaatttttt caaaaaatca cctcctanat ttgttgtttt ttaaggggtt      180
ttatgtctct atctccttca gttcaactct gatcttggnt atttcttgnc ttctgctaga      240
tttggggttt gntttctgnt ggntctctaa gttcttttttg ntgngacatt agattgncaa     300
cttaaaatct ttctagctat ttgacgtggg catttaatgc tataaatttc ctggtaacac      360
tgctttcgct gtatnccana naatctggga tggtggggcc ttggtttcaa taanttccaa      420
tacctcttaa gggggnggag ccaanaagan ctaatagggg cagcactgct ctgggctncc      480
atcaanaagg acaaaaactg ggagngaccc tgcttnttca ctgaggnacc ggcccggccg      540
gccgtccnaa ggcgaatcca cncnctggcg gccgtctatg gatccacccg gnccaactgg      600
ggaatatggc aaa                                                          613
```

<210> 145
<211> 345
<212> DNA
<213> Homo sapiens

<400> 145

```
acactgatct acaaaaattt taaaatgagc cgggcgcggt gactcacgcc tgtaatccca       60
gcactttggg aggccaaagc aggcggatca tgaggtcagg agatcaagac catcctggct      120
aacacggtga aaccccgtct ctactaaaaa tacaaaaaat tagccgggtg tggtggcggg      180
cacctgtagt cccagctact cgggaggctg aggcaggaga atggcgtgaa gccgggaggt      240
ggagcttgca gtgagccgag atcacaccac tgcactccag cctgggcaac aaagcaagac      300
tctcaaaaaa gaaaaaaatt ttttttaaa tgagctgggt gtacc                       345
```

<210> 146
<211> 475
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(475)
<223> n = A,T,C or G

<400> 146

```
actacaaggt ttagcatttg ctctgctggt cgacattccc ccagtctatg ggttgtatgc       60
atcctttttc ccagccataa tctacctttt cttcggcact tccagacaca tatccgtggg      120
tccgtttccg attctgagta tgatggtggg actagcagtt tcaggagcag tttcaaaagc      180
agtcccagat cgcaatgcaa ctactttggg attgcctaac aactcgaata attcttcact      240
actggatgac gagagggtga gggtggcggc ggcggcatca gtcacagtgc tttctggaat      300
catccagttg gcttttggga ttctgcggat tggatttgta gtgatatacc tgtctgagtt      360
cctcatcagt ggcttcacta ctgctgctgc tgncatgttt tggtttccca actcaaattc      420
atttttcaat tgacagtccc gtcacacact gatccagttt caattttaaa agacc           475
```

<210> 147
<211> 629
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(629)
<223> n = A,T,C or G

<400> 147
cgaggtacgc gggatttgaa tcttaaactg tatttttctc ttagtattgc taatgagtaa 60
agaaaagtct cataaggtag ccaaatgaaa aagaatgaaa gggaaagtga aaaattaagg 120
ggacaaaaga tgggatgtga aaagaagaat tctagtttga tggtgactca tattcacgat 180
aggatacaaa gtgtgatttg ttggaaacat gtcccaaatt tctaaaattc tgcttctctg 240
ccaaaagcaa tgtctttctt ggttgatatt tgagttttaa aagggtcaaa tctttctaat 300
tttttgtatc tttagagggc agcactagaa gaaatcagca ggtctaatcc caccagtaag 360
aaaactacca cttcttgatt tttacagatt taaaaaaatc ttttcagtgc ctttcttttt 420
aatgtaaata caaatttaaa cctangctta atatagcgtt tccctttccc caagtgatgt 480
cnaggtcgat gccaaatcaa tgatccnaaa tgatcgnggt naaaataact caaagggttc 540
ttaaggngag tngcatgcca aaaaatacct tgattccggg ggtttggacc tggctttgtt 600
ggggcctntg aaatgccaan ttancccan 629

<210> 148
<211> 614
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(614)
<223> n = A,T,C or G

<400> 148
acaaaagagc ctgattcttt ttaattccac aaatacctag catctcaaag taacatgtaa 60
acaaacttct atgctgctca atgaatcctt ccaatttcga taataaacta aatagtattg 120
gatctagtat atgactttca tgtgtaagtt atggttctat ccattacttt aacaatatta 180
ctgatgtaac agagaaaaat tttcaactat tgtatttatt taaaacaaac tgacaagttc 240
aagcacctgt cttcagaaaa gccagcagca tttttttttt ttaacatact caaagtaaga 300
tttggcctaa gcccttaata cctttctgaa cagccatgca actaaacacc ctcagggaga 360
tgttacataa gggagagaag aacatggagc aatttgcact ttttccctag ataatattaa 420
caaggnaaag caaatncaga tctttatgaa tgaatggntg gcatggttaa tcacttggac 480
tttttaaact agagncncta tcatattggt aaatagaaan aaaggatttt aataaagctc 540
tncctgcttc aaaattaagg ggacnttttc tgggaggctt tcagggacca taataaggta 600
aaaggggacg gttg 614

<210> 149
<211> 628
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(628)
<223> n = A,T,C or G

<400> 149
nccgaggnac tttnnttttt tttttttttt ttttnaacag cgncttttca tttttattac 60
tcaaaaaagt ttcatttttt tatttaagct ttctgactct gngcttgggc cttcaacact 120
ttcacaacga ttttctgctc ctcgataagg aaagcccgct tgatcctana aaggaaaata 180
ccaaattaat catttcttta aaatgaactt catttttttat ttagcccaaa aaaggnaaac 240
atggtaaaga accaagcnaa gcaatcaggg aacccaggaa actacnggat acccaaatac 300

ngagtaaaac ttaaaagggg aaattcattt aaagcaggga aatccctcaa tttcatgccn 360
gtagttatct gncctcctct gagcaagaat aactatgaag catcccccag gagaccacnt 420
atgagactta attattggta ggatccagga atagnggnat ttnttgattt gcaaaangtn 480
taaaaaattt taaccctntt ttgaaaattc ccagnaaaaa caccncataa ggggctntgt 540
gttaaaacta aaattaaagg gaagggtttt tccagaaacc ccccccanac cagggtttna 600
accggttang gcanntcncc aaaccnan 628

<210> 150
<211> 509
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(509)
<223> n = A,T,C or G

<400> 150
ttggggaann aaaaaaaaac tttttttttt nggggnnngg ggntgcnanc natncaaaaa 60
tcaaaancnt ntttgggttt taactttttt tttttgntt gncaaannaa aantaaantt 120
tntttttana tttgctaang ggccngancn gcnnaaaaaa ncctttttn ggggaanctt 180
nggggcaaat tnnttnancn acccttttggg anaactttn ttagggggn nnnaaccgnc 240
atttttgccc actttttcc cttttgntta angggncct tgggcnggac cnccccttagg 300
ggnaattcac ccnctggggg gcgttatntt ggatccactc ggnccaactt gggggaaaaa 360
gggaaaacnt tttctggggn aaattttttc ccncnaaatt cccaanaana aaaccggaac 420
nnaaanttaa acccgggggc ccaaggnggg ccnncccntt nttgggtggg ccctgcccnt 480
ttaangggaa atttggccc tttttaaaa 509

<210> 151
<211> 622
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(622)
<223> n = A,T,C or G

<400> 151
ggtacttttt tttttttttt tttttttgc tttggacaaa tttattgaaa catacaggcg 60
gctgttagca gagaaatcat tccatgattg atgtgttaca tttggccact accttgaatg 120
tataatttaa aaattatatt tttcacaact aagcctttgg ccaaaaaagt catttagcac 180
atctttaaag atcaataaga aatggatttt ggacattaaa aagatcaagt cactgaatta 240
aacagtagca acccccatta atctagaatc ccatagtgct gaaggtagag gtgtctgtgc 300
aaagctagtc atttgttaac agcaatcana aaanatgggg gcaggcacac ctgtcaaaag 360
tggcaacana nctggcagga caggacggct gggctggtct ggtcaggtga gcatgtncca 420
aaaacagcag caacagaaaa cccgtccacc angcttgtga agcangtgga tggtcctagc 480
tcatctnttn ttttggnctt ntancacata cactgngggt ttangangnt tctgaggncc 540
accttgccnc cctacctgcc cgggnggccg ttnaaagggg aattccacca ctgggggccg 600
tctaatggga cccacctggg cc 622

<210> 152
<211> 313

<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(313)
<223> n = A,T,C or G

<400> 152
```
acggtggatt agttcttttc agcatgttcc ttctgtatga tacccagaaa gtaatcaagc    60
gtgcagaagt atcaccaatg tatggagttc aaaaatatga tcccattaac tcgatgctga   120
gtatctacat ggatacatta aatatattta tgcgagttgc aactatgctg gcaactggag   180
gcaacagaaa gaaatgaagt gactcagctt ctggcttctc tgctacatca aatatcttgt   240
ttaatggggc agatatgcat taaatagttt gtacgcgggg aaaaaaaaan aaaaaaaaaa   300
aaaaaaaagt acc                                                      313
```

<210> 153
<211> 620
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(620)
<223> n = A,T,C or G

<400> 153
```
cgaggtacgc gggagggcaa caagaaccat ttccaatcta gaggaaagct ccccagcatt    60
gcttgctcct gggcaaacat tgctcttgag ttaagtgacc taattcccct gggagacata   120
cgcatcaact gtggaggtcc gaggggatga gaagggatac ccaccacctt tcaagggtca   180
caagctcact ctctgacaag tcagaatagg gacactgctt ctatccctcc aatggagaga   240
ttctggcaac ctttgaacag cccagagctt gcaacctagc ctcacccaag aagactggaa   300
agagacatat ctctcagctt tttcaggagg cgtgcctggg aatccaggaa ctttttgatg   360
ctaattagaa ggcctggact aaaaatgtcc actatggggt gcactctaca gtttttgaaa   420
tgctaggagg caaaaggggc agagagtaaa aaacatgacc tggtagaagg aanaaagcaa   480
aggaaactgg tggggaggat caattagaga ngaggccctg ggatccncnt nttcntaggn   540
ccctctcata cnaaggacac tttttatatg ccttcccaaa ctgntnggga agggtnaaac   600
caaaatccgg ggtanaacct                                               620
```

<210> 154
<211> 339
<212> DNA
<213> Homo sapiens

<400> 154
```
ggtacctgga ggatatagac ctgaaaacac tggagaagga accaaggact ttcaaagcaa    60
aggagctatg ggaaaaaaat ggagctgtga ttatggccgt gcggaggcca ggctgtttcc   120
tctgtcgaga ggaagctgcg gatctgtcct ccctgaaaag catgttggac cagctgggcc   180
gtccccctct atgcagtggt aaaggagcac atcaggactg aagtgaagga tttccagcct   240
tatttcaaag gagaaatctt ctggatgaaa agaaaaagtt ctatggtcca caaaggcgga   300
agatgatgtt tatgggattt atccgtctgg gagtgtggt                          339
```

<210> 155

<211> 450
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(450)
<223> n = A,T,C or G

<400> 155
cgaggtactt ttttttttt ttttttttt tttttcntat ttttgtttaa tttatttaan 60
accacctnct tacaacttnc anagagaaaa tacaaaacaa gaaacanact tggtttnaaa 120
tgcataacca gntgctggan tttaaagcat tactgataac attgttacan aanaatggca 180
nnttactcna gggcacttna gtattcctna ggaataaaca ttgatttctc ttgtcctccc 240
nntgggatgt tctcangtna agtcactgcn cctgcnctta gacatatttt ccatgtnnca 300
naananggag cctgnaaant atgctnacag tnggaataag ccattnctaa ttccatgcca 360
naaccnangg ctaatggnnc attcttttt aataaggtat gtggaaaana ttcntatccc 420
aaanaaaant tgcccggncg gtctntntaa 450

<210> 156
<211> 760
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(760)
<223> n = A,T,C or G

<400> 156
cgaggtactg ccccagtgaa aatggaactg aaagagcctg tagctgtcag agaaaggacc 60
acctttcagc actgatcggt tatcgttgtc ctcaaaattt acatggaagg aatgccccac 120
attgataatt tctttggctg tggctgggtt gtaggagaca ctaataggtt tcagagaggt 180
gtcatgtttg gtttcactgg ttttaatatc aacaggggac tggttatttc cattggcaat 240
gggatacagc ttgctccatt gttcaggacc atttttgtca tcatatcccc agtctggact 300
tgccattatc ttctactgag ttttcttttt ctgaaaacaa aaataatacc tggaataact 360
aactgccccc gcgtcctgcc cgggcggcca aaggggcaat tccaccactg gcggccgtac 420
ttatggatcc aactcgtccc ancttggcgt aatatggcat aactgttctg nggnaaatgt 480
atcccttaca attcccncac atcnacccga acctaantgt aancctnggn gcnnataagg 540
actactnctt aatgggtggc tctgncnttt caannggaac cttngcnctn gntatgattg 600
ccaccccgga naggggtggt ttggccttcc ntcttgtann aatcttcncg gnttgttgga 660
anggtnntct taggggatng ttccaatggg gaccgnaanc ttccagccna ggcaccaaan 720
cnttggttta ncccccacnn aaaantanag gggncngggt 760

<210> 157
<211> 668
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(668)
<223> n = A,T,C or G

<400> 157
ggtacccagt agtcattcag gaacaggttg ttcagtttcc atgtagttga gcggttttga 60
gtgagtttct taaacctgag ttgtcgtttg attgcactgt ggtctgagag acagtttgtt 120
ataatttctg ttcttttaca tttgctgagg agtgctttac ttccacctat gtggtcaatt 180
ttggaataag tgagatgtgg tgctaaaaag aatatatatt ctgttgattt gaggtggaga 240
gttctgtaga tgtctattag gtctgcttgg tgcanagctg agtcaattcc tggatatcct 300
tggtaacttt ctgcttgttg ntctgtctaa tattgacagt ggggcgttaa agtctcccat 360
attattgtgt gggagtctaa tctctttgta ggtctctaag gacttgcttt ataaactggg 420
tgctcttgat tgggtgcaat atatttagga tagttagctc ttcttggtga atgganccctt 480
taccaatatg aatggcctcc ttcctttga ccttgtgggt taaagctggt tatngaaact 540
ggatgganccc ctgctttttt tggttcattt cttgnagggt cctcagcctt attttancnn 600
gnggctttgn cccncntccg cggcnttaag ggaaccacnc tgngcgtcta ngancactgg 660
caactggg 668

<210> 158
<211> 737
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(737)
<223> n = A,T,C or G

<400> 158
tttttttaag ggtcaatgtt tacatttttt tcatataaat atcaagttgt cagcaccatc 60
tgttgaaaaa aatctttgta atggctaatc ttttatgtca ttagatttga taatagttta 120
agaatttttg ttcctatatt catgagggtt gctttccttt aactttttttg ttttgtaatg 180
tctgtgtcag gntttactat tagaacaata ctagtctagt aaaaaaaaaa anaaacaaaa 240
aactancaag tgtntctccc cttctattta taanaanggn gttacttctt ccttaaatgg 300
nnaaattatg agngaaactt ggagtatcnt tgcnggantg gaagtttcct tgtggaaaga 360
attttatnat nattacattt caatagtncc gcntccctgc ncgggcggnn ntcaaaggcg 420
aatncagcaa attgntggcc gntactnngg accaacntcg gnccatnntg gggnancang 480
tcaanctgtt ctngnnaatt gtnccccttcc aatncccaca nanaaccgaa cctaaatgga 540
acccngggggc tantaangnc taccnntatt gngnggctnn gcccttnnnt ggaaactgnt 600
cnaccnttat aatggccccc cnggaaggnt tntttggcct tctnntncaa anctggcngg 660
nttntgtgna ggttatctna ntggatgttc cacgggaacn gaanatntan ncagtggacn 720
aaanntnntn ttttnct 737

<210> 159
<211> 739
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(739)
<223> n = A,T,C or G

<400> 159
cgagggtaca ctgtgagaga ataacatgga cttgatatgg catcacactt gttttaaagc 60
aaaaaaaaag aaaaaaagaa aaaaaagaaa gtacagttaa aaagtaagca ttgtagtaaa 120

```
tagtggattc tctggtgtgt attttttatc tcagtgttga aaattggaaa agaatgggct      180
gaagtctaaa aactggaata atgaaggaca ctaaatgcct ttattgtaga tactatgttt      240
gtaagtctat agctaagcaa cttaagccaa aaaggtcttt caactgaagc tttaatcaac      300
ttattttgga gatgttctct tccttatctc atgcgtcatc cctaaaataa taagatacat      360
gggatcaaat aacccttgcc ttttcaacac aaatcagttg gaaaattatg ggttgagtcc      420
tgttgctgcc atggttctgt tctcaaaatg agtgtgtatg acatcccatc tatgtaatag      480
gctacctttt tggctcttgg aactttgtcc tgccggccgg ccnttaaggc nantcnacca      540
ctggcggccg tactatgggn tccagctcgt ccaaccttgc tatcntggct acttttctgg      600
ngaatgtatc cgtncatccc cacttcancg gagctaangg aancntgggc ctatggggct      660
actccatatg ctngccnctg cnttcnangg aacncgcntc ttaanatgca cccnggaagg      720
gtngtngcct tcnttcttt                                                   739
```

<210> 160
<211> 802
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(802)
<223> n = A,T,C or G

<400> 160

```
cgaggtacag cagagacctt cctgcttttt actggggact ccagattttc cccaaacttg       60
cttctgttga gatttttccc tcaccttgcc tctcaggcac aataaatata gttataccac      120
taaaaaaaaa aaaaaaaaag tacgcggggg cccattgttt ttgtaatctc tgaggagaag      180
cagcagcaaa catttgctag tcagacaagt gacagggaat ggattccaaa caccagtgtg      240
taaagctaaa tgatggccac ttcatgcctg tattgggatt tggcacctat gcacctccag      300
aggttccgag aagtaaagct ttggaggtca caaaattagc aatagaagct gggttccgcc      360
atatagattc tgctcattta tncaatatga ggagcaggtt gactggccat ncgaagcaag      420
aatgcagatg gcagtgtgaa gaaagaaaca tatttacctt taaagcttgg tccctttttna     480
tcgaccnaag tggtccgaca agcttggaaa attactngan aaagctcaat nggactatgt      540
gactcttttt aataatttcc anggntttaa acccgtgagg acttttcccc cgntaaatgg      600
aaagtatttt gcnannggac ttgacttccc ggngccntaa gngaattcac cactgggggg      660
gnttagggtc cnnntggnca anttggnaaa ngggtaatnn cntgnaatgt tcctcatccc      720
aantngccgn ataantaacc gggcaaaggg cccaaatggn gccctccttn nngaatnanc      780
cctntannna ancggggggg gg                                               802
```

<210> 161
<211> 214
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(214)
<223> n = A,T,C or G

<400> 161

```
acttttnntt tattcnttat ttttgggacc tgctctcact gtccacccag actggagtgc       60
antggcacca ttatagctna ctgcagcctt gacctnntgg gctcaagtga tcctnctgtc      120
tacacccccc aagnatgntg tgacattatg cttggataat acttgtatnt tangtaaaga      180
cagggtcttt ccnatnnacc nggnagatct naaa                                  214
```

```
<210> 162
<211> 304
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(304)
<223> n = A,T,C or G

<400> 162
acttaggaat acaactatat acatatgatt ttatttttaa gaccatatta tatttgggta     60
tctactaata ttttgtataa agcaattttt tgttccatta cgtgactttt tgttttattg    120
tatatgtaat ttaacacaca ataaagggta aagttgcttc cccaaaccac acttttaatc    180
aaaacctaga atcatctgca gtccttgtta aaaatgcagg tttctagaac cctctgaagt    240
tctgattaaa taaatttatt gcaaatcaaa naaaanaaaa aaaaaaaaaa agnccccggg    300
gnta                                                                 304

<210> 163
<211> 461
<212> DNA
<213> Homo sapiens

<400> 163
actagagcca gtcatcctta acaaatcttt tcacatttta tttctttcac atgtagtcat     60
cttcaaaaag gaaagatttg gaattttaga aaaggggcaa ctcttctttt tagcattctc    120
atcagaaagt cacaaaaatc gatggaatca tttccactgg gaagattgac cttttgtatt    180
tatttgtggg gtaaattaat aagcattcca gatgcttgca gcttcctgca tccaggagat    240
gctgtgttcc ccgtgatgca gctggaaccc aagctgcagc aggagatgca agtttcagga    300
tgttccccac tgagctggag gaatatctac agcagtgatg cttgaaattt tgtatgaatt    360
attttgtcgc ctaccctttt cctccaaaca aaaattagag gattatttaa tccttgggat    420
cttccccttt ttgagaaata aagtttttat caaaaaaaaa a                        461

<210> 164
<211> 345
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(345)
<223> n = A,T,C or G

<400> 164
tttttttgag acaaggtctt actctgtcac ccaggctgga gtgcagtggc atgatcttgg     60
ctcactgcac cctctgcatc ccaggttcaa gtgattctcc tgtctcagcc tcccttgtag    120
ctgggattac agccacttgc cactgcaacc ggctaatttt tgtattctta gtagagatgg    180
ggttttacca tgttggccag gctggtcttg aactcctgac ctcaagtgat ccacctgcct    240
ccatgtccaa agtgctggga ttacaggcat gagccaccac ccctggccta agtcattaat    300
ttaaaaaatg ttattaggat gancgacctg ccgggcggcc gntaa                    345

<210> 165
```

<211> 385
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(385)
<223> n = A,T,C or G

<400> 165
actgaaacag aaactntacc caattgcagt ccatatgttt tctgggatcc cggagttccc 60
tttcaacaat gtaaaataca nacttaggtc aaaagttccc atgtctgaga aaactcaagc 120
caaatcagtt ctcctccaaa gttgacagga tttatgcttt aaaaatagag atacagaatt 180
ctctttggaa agatctacca aattcctgta agaaacagtc tacccaaagt aggggaaagg 240
ctatatgana agttcaaggc acttcttaaa aatatatctt aggttttagg gaaaggaaac 300
agacaagttt ccagacccgt gggtggaatg gatgtagcag atcactgaga ggttacaagc 360
gccgacctng gccgngacac gctan 385

<210> 166
<211> 745
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(745)
<223> n = A,T,C or G

<400> 166
tttttgacga tgtctctcaa caatacctga agtttctcat actcatcatc ccaagtctga 60
aaaacttcaa agcatgctac cataactttt tcaaattctt cataagcaac atgcatcaat 120
ttcctagtgc ccaatacttt gagtaattga gaactcaagt ctcttgaaat tgcctccacc 180
aaacgcagtg ccctctgaat aggatatttt gtgtttcgga tctttctcaa atcccgcgta 240
ctttgagaag ctgaggcggc agatcacttg aggccaggag ttcgagacca gtctcgtcaa 300
catggcgaaa ccctgctcta caaaaaaaaa aaaanaanaa aaattagcca gacatggngg 360
cccacatctg tagtcccagc tacttganan gctgaggcat gagaatagct tgacctggaa 420
nggcaaaggt ttantgancc caaactgngc ctggattcca atnnggngga cccagtgana 480
tttgtctcaa aaaaangaaa ggaaaaaaga gcccgncgga aggaaggatg gattgangga 540
aaattgtggc ctccnnnnaa aggnccaang gccctnangt ttctttgaat agtttccctn 600
gccnttctta ngggcctnng cctttttttcn nnctggcgaa cctaggnatt cacatggggg 660
ttangacncc gccnctggga naggaaagtn ctggaagnnc ncntcccaat ancgnntang 720
aacgggcngn ggannaattt tttnc 745

<210> 167
<211> 623
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(623)
<223> n = A,T,C or G

<400> 167
accagccact gcaaaaacat gccaaattgt aaagaccatc gaggctggga agaaactgca 60
tcaactaacg agcaaaataa ccagctaaca tcataatgac aggatcaaat tcacacgtaa 120
cactattaac ctgaaatgta aatggactaa attctccaat taaaagacac agactggcaa 180
attggataaa gagtcaagac ccatcagtgt gctgtattca ggagacccat ctcatgtgca 240
gagacataca taggctcaaa ataaaggaat ggaggaagat ctaccaagca aatggaaaac 300
aaaaaaaggc aagggttgca atcctagtct ctgataaaac agattttaaa ccacaaagat 360
caaaagagac aaagaaggcc attacataat ggtaaaggga tcaattcaca agaagggcta 420
ctattctaaa tatatatgca cccaatacag gaccccccaga ttcatgaagc aaatccttga 480
gattnccaaa ggattaactc cncccngtat tatggagact tncacccact ntnacctttc 540
ccgatcttgn cccaaagtac cnggtttccc gaattgactn gtttgncann gggctattaa 600
tttngaattt cncccaaaaa aaa 623

<210> 168
<211> 703
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(703)
<223> n = A,T,C or G

<400> 168
ggtactccct gtttgctgca gaatgtcaga tattttggat gttgcataag agtcctattt 60
gccccagtta attcaacttt tgtctgcctg ttttgtggac tggctggctc tgttagaact 120
ctgtccaaaa agtgcatgga atataacttg taaagcttcc cacaattgac aatatatatg 180
catgtgttta aaccaaatcc agaaagctta aacaatagag ctgcataata gtatttatta 240
aagaatcaca actgtaaaca tgagaataac ttaaggattc tagtttagtt ttttgtaatt 300
gcaaattata tttttgctgc tgatatatta gaataatttt taaatgtcat cttgaaatag 360
aaatatgtat tttaagcact cacgcaaagg taaatgagca cgttttaaat gtgtgtgtgc 420
taattttttc cataagaatt gtaaacattg actgaacaaa tacctatatg gattggtaat 480
gacttatgag caanctgctt ggccagacag ttacccaaac tttatatatn tnngaaggta 540
tacactgnga aatctctggc taancgaatg cntccagggg taanngggtn tggntggant 600
aaanaatgcc ctgcaaaaaa aaaaaaaaaa aagccttccg nggccttnaa nggaatcnnc 660
angggnntnn ggccactggc cactggnaaa ngnaacgtct gga 703

<210> 169
<211> 609
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(609)
<223> n = A,T,C or G

<400> 169
acgtccatct tccagctgct tgccagcaaa gatcagtctc tgctgatcag gaggaattcc 60
ttccttatcc tggatcttgg cctttacatt ttctatcgta tccgagggtt caacctcgag 120
ggtgatggtc ttaccagtca gggtcttcac gaagatttgc atcccacctc tgagacggag 180
caccaggtgc agggtggact ctttctggat gttgtagtca gacagggtgc gtccatcttc 240
cagctgtttc ccagcaaaga tcaacctctg ctggtcagga gggatgcctt ccttgtcttg 300

```
gatctttgcc ttgacattct caatggtgtc actcggctcc acttcgagag tgatggtctt     360
accaagtcag ggtcttcacg aagatctgca tcccacctct aagacggagc accaggtgca     420
gggtggactc tttctggatg ttgtaatcag acanggtgcg ttcatctttc actgnttcca     480
caaaaaacaa cctctgctgg canganggat ccttccttnc ttggactttg cctgacattc     540
tnatggngta ctccgctccc ttcaaaggga tgncttacan tcanggnctt acnaaaattt     600
cntccnctt                                                             609

      <210> 170
      <211> 617
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(617)
      <223> n = A,T,C or G

      <400> 170
acaaagaaca tgtagctata ggaaataata gtgtaaatag cagtatataa actggcccat      60
gtaaaataca aaaatattca ctgaagtcag gttttctata aaacagtgtt tattagaggt     120
attttactat gaatcaggca tataatctga atgtagaaac ttttagaaat attaacagca     180
ttcagtcagt gccatgcact tgtgcttcca attatttttt taaagctgct ttgttttgac     240
tcatgtgaaa tagttaaggc ctacattctt atacacatta tccatcttac aaggttaaca     300
attttacact aaaacacagt ttaaattaaa aacgattttg aaaaattaca tctatattta     360
atccctaaga agtgttttaa gctggtaatg cagctcgctg tagctctaag agaggggtta     420
gtcaggaatc tgatcttgag ccataaangg tttcaggcta aacaaagaac aaatttaagt     480
gacagaaaat attataattn caatatactc agttttttgg tataaaatac cctgctagca     540
tgccactggc tatattgngg gcataatata aaatgncggg gggggggatg gancctccaa     600
gncaaanttt ggaccca                                                    617

      <210> 171
      <211> 621
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(621)
      <223> n = A,T,C or G

      <400> 171
acagtatggg ggttgtaaat tggcatggaa atttaaagca ggttcttgtt ggtgcacagc      60
acaaattagt tatatatggg gatggtagtt ttttcatctt cagttgtctc tgatgcagct     120
tatacgaaat aattgttgtt ctgttaactg aataccactc tgtaattgca aaaaaaaaaa     180
aagttgcagc tgttttgttg acattctgaa tgcttctaag taaatacaat tttttttatt     240
agtattgttg tccttttcat aggtctgaaa tttttcttct tgaggggaag ctagtctttt     300
gcttttgccc attttgaatc acatgaatta ttacagtgtt tatcctttca tatagttagc     360
taataaaaag cttttgtcta cacaccctgc atatcataat gggggtaaag ttaagttgag     420
atagttttca tccataactg aacatccaaa atcttgatca gttaaaaaat ttcacataac     480
ccacttacat ttaccaactg gaagaataat caatctctca agcatgggat tattagaatc     540
aacantttga aagctgtcct tgaaggctaa taaaaaagnt tgtctaacct ttcatgaggn     600
cttnttntta ctnccttacn g                                               621
```

<210> 172
<211> 399
<212> DNA
<213> Homo sapiens

<400> 172
actcaaaatt acacatttgt ttaaataaat atccacacaa attctcagtt acatcaagta 60
gctggtttat atttagatta tctcaagtag gggggaataa ccatgtgtag gaattcatag 120
aaaaataaac aatcagctga agaggtctaa gaaaatgctg acttttaaaa tttcacttat 180
tttccttgaa gttttctacc cttcccatcg atgataaacc aagatcatgt aatggaaaat 240
ttcaaaccag ggctaaattc taaagtaaag cttcaattca agcccttccc ccaagagaat 300
taattttcct gatttctctt tctctcacat ctaaggagaa cattttaggc agttaaattt 360
cagaacttca aggtttcatc agggtcacct ttatgtacc 399

<210> 173
<211> 616
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(616)
<223> n = A,T,C or G

<400> 173
actttgtgga taagaaaatg gaggaacaca tctgatggag agtgggcatt tgacaacaat 60
ggaacaggta acctgcatgt aaaatcaaaa tataagtgtc tttttaagag ctgaaagctg 120
ctgctggtca ttcattaatg tgtcagacat ttaatcagga tgctggacct tcaaaataac 180
tgaaaaaaga accaagaaaa ggcgtttttg ttttcaacaa actttactaa ataaccctgg 240
aaaggcaatg aacgatctga caatttaagc tctaatgatt taaagctcag ctagaagaaa 300
gtgaggcatg acatatactg tcaacggagg gtgaaggagg canatttctg gaaatgcaat 360
gatcccacca tttgcttcaa ngagaaacct gcanacatat tttcangtct tgntaagtna 420
caactgtnta tttgtaatca atcatttngg aaaagtctgc tatgtaactt angncactgt 480
gcccccnacc accgatgaaa aggaaaaacc cctgacacca ggaaaatcct tccatcctca 540
aanaaattaa gngaccaacn tttaaagaaa aaaaatnanc ccncctctnt ttacaaatnt 600
ttcntccaaa tnttcn 616

<210> 174
<211> 631
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(631)
<223> n = A,T,C or G

<400> 174
ggtacgcggg gacacgcacg ccgggcgtgc cagtttataa agggagagag caagcagcga 60
gtcttgaagc tctgtttggt gctttggatc catttccatc ggtccttaca gccgctcgtc 120
agactccagc agccaagatg gtgaagcaga tcgagagcaa gactgctttt caggaagcct 180
tggacgctgc aggtgataaa cttgtagtag ttgacttctc agccacgtgg tgtgggcctt 240
gcaaaatgat caagcctttc tttcattccc tctctgaaaa gtattccaac gtgatattcc 300

ttgaagtaga tgtggatgac tgtcaggatg ttgcttcaaa agtgtgaagt caaatgcatg 360
ccaacattcc agttttttaa gaaagggaca aaaggtgggt gaattttctg gagccaataa 420
ggaaaagctt gaagccacca ttaatgaatt aatctaatca tgttttctga aaacataacc 480
accattggct atttaaaact tgtaattttt ttaattttcc aaaatttaaa tttgaanact 540
taacccccant tgccatntgn gtgacaataa aacattatgc taccentttt aaaaaaaaaa 600
aaaaaaaaaa agtcctgccc ggcggccctc a 631

<210> 175
<211> 261
<212> DNA
<213> Homo sapiens

<400> 175
acgaacctac agttttaact gtggatattg ttacgtagcc taaggctcct gttttgcaca 60
gccaaattta aaactgttgg aatggatttt tctttaactg ccgtaattta actttctggg 120
ttgcctttgt ttttggcgtg gctgacttac atcatgtgtt ggggaagggc ctgcccagtt 180
gcactcaggt gacatcctcc agatagtgta gctgaggagg cacctacact cacctgcact 240
aacagagtgg ccgtcctaac c 261

<210> 176
<211> 616
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(616)
<223> n = A,T,C or G

<400> 176
cgaggtactc tgccttttag gagatgaggt aagacatata catagatggc ttttactagc 60
caaggcaatg taaatggact aagattctca tgtgacttga ggttatctga tgaatttatt 120
ctcttcaaaa ccacctacct ttagagggca tgtttaaccc ctctctttat ttaaggaggg 180
agagaaaaac acatgtaacc agaattcaga gtgggttact caacctaaga gaacatacgg 240
agttctcttt gggaaaacaa caagactaca gtgttcactt cgcaccatga agtggcactc 300
ctgttatggc tgtcagagtc ctctcacttc ttatgaaagg atgcatctga ttctgaaatt 360
actgatatat tcgatcagtt anggatgttt taaaaagtga aaacaaatgc cacacataca 420
ctttctagct ttcttgaaat cacccgacac attccaaaaa tagagaattc cctattactt 480
ttagagaaat ttccatatan tcttggtnaa gaanccagtt gngcntattc caatttcagg 540
gtcttggttt ttgcccaaac ccaagtgttt ccntntttta nggcttttca tggccgattt 600
naaaccttnt ttgtgg 616

<210> 177
<211> 632
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(632)
<223> n = A,T,C or G

<400> 177

cgaggtacag gtcagagtct tcttttcttt tctttttgag atggagtctt gctctgttgc 60
cagactggag tgcagtggtg cgatctgggc tcactgcaat ctccacctcc cgggttcaag 120
cgattctcct gcctcagcct cccgagtaac tgggactaca ggtgtgcgcc accaagccca 180
gctcattttt gtatttttag tanagatggg gtttcacggt gttggctagg atggtctcga 240
tctctggtca gaagtctttt ctgtaaatat ccttggtaaa gaagcaattt tagactgtag 300
ctgttgcaaa tgctttaagg aagaagcaaa acaactgtca gtcttcctga aatgaaaaaa 360
ctacaccagg gctgctatat caaagcaacc ccaaccagca cttcaatcat gatgcccaca 420
gtggccccac tgagaaacca agaaaagttn cagatacaaa actgngatgc tcttgctatg 480
gnaatattgc nggcngtanc caagttagaa accaaacaag cntanggccc cgttnttttt 540
tggcgtgatt ttggcaanaa aaaaaactgg gngngtggtg ngggttccca ttgtaccccc 600
aaaaaacttn gggatgggtt aaagcccnng gc 632

<210> 178
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 178
actttntttt tttttttttt tttttttttg ggatttagtt tttatttcat aatcataaac 60
ttaactctgc aatccagcta ggcatgggag ggaacaagga aaacatggaa cccaaaggga 120
actgcagcga gagcacaaag attctaggat actgcgagca aatggggtgg aggggtgctc 180
tcctgagcta canaaggaat gatctggtgg ttaagataaa aaacaagtca aacttattcg 240
agttgtccac agtcagcaat ggtgatcttc ttgctggtct tgccattcct ggacccaaag 300
cgctccatgg cctccacaat attcatgcct tctttcactt tgccaaacac cacatgcttg 360
ccatccaacc actcaatctt ggcagtgcag atgaaaaact gggaaccatt tgtgttgggt 420
ccaacatttg ccatggacaa aatccangac ccgtatgctt taagatgaaa ttctcatttc 480
aaatttcttc ccataaatgg acttgccnca tgccatnttg ggtgtgaagt nccnccttgc 540
ncataaccct ggaatatttt tgaaacagaa ccttttacca atcntttttt catgttaaaa 600
acnaaaattt t 611

<210> 179
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 179
acctcaattt tatcatttta gagtatttgt tagaatagga tctctccaaa atcaaacagg 60
atcaatctgg tcacgtctaa tcctaagaca aaacactatg taaaattttc ctgtatctaa 120
atgttgccct ctaggtaaat ctgtgatatt ttagagactt tcttttgtgg aaaaggtaat 180
ctgataaatg ggaagagatc atcagacaag ttcacaaata accattattt ctgcagaatt 240
cagttgaagt tggttttttg taaatgctta ttgggaattt ctaaagcact gacttggaga 300
ggccaagagc ctccatcaat ccctgcttgg atagccactc ccgttactac tgctaggtca 360
gggtctacag atgtgttggg atcttttcca aagaactctt gaatgacttg acggatccga 420

ggaataccaa tggagccccc aactaaaacc acctcatcaa tctcagtctt ttncaggtgg 480
ncttcttcaa tctcctgaat gggacctcgg ccgcancacn ctanggcgaa ttccacacct 540
ggcggccgta ctaatggatc caactcgnac caacttgggg aacatggcta gtnttcnngg 600
ggaaatgttt c 611

<210> 180
<211> 621
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(621)
<223> n = A,T,C or G

<400> 180
acccttaaac tggcaggaca tttttgaaat cacaaatttg cacataaaga atgtcacgaa 60
cagccatgta tccatataca gcaatcaaat aaggaactta tgacctaaag caaaggtaaa 120
ctttcttgaa acttaacatt ctataccaac taggcaacct ctgcccagga tgagagttgg 180
atttttcaaa aacctctaat ttaatagtgc agcatttcgt tttccctgat ggcctgtgtt 240
tcacagcagt ttttaaaaac tgcttgttca actatagctg cagcctatat cccagctatg 300
gaaaaaaaag taaatcttag ttcaattttt gccagttgtt tctgtattta aatttaaaaa 360
aaaacacact tccgctgggc aggtttagag ggttattatc aagtctgtgc ataactaaaa 420
gttcaaagca aattcaattt tgcttaangg aacattgnna aagnacaatt cttggnanta 480
catgcctcgt tgatccattt naancatana aaattcaccc ttgtgtactg gttcaagaaa 540
aaaaccgatt tgacagttaa acatnttaaa anccccaacc tntgaagttc aaccaaactg 600
gantttgtt cctcgcccga c 621

<210> 181
<211> 606
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(606)
<223> n = A,T,C or G

<400> 181
cgaggtacag accagagaca aagcaagaga agaagcagag actgttggcc cgggccgaga 60
agaaggctgc tggcaaaggg gacgtcccaa cgaanagacc acctgtcctt cgagcaggag 120
ttaacaccgt caccaccttg gtggagaaca agaaagctca nctggtggtg attgcacacg 180
acgtggatcc catcgagctg gttgtcttct tgcctgccct gtgtcgtaaa atgggggccc 240
cttactgcat tatcaangga aaggcaagac tgggacgtct agtccacaag gaagacctgc 300
accactgtcg ccttcacaca ggtgaactcg gaagacaaag gcgctttggc taaactggtg 360
gaagctatca ggaccaatta caatgacnga tacnatgaga tccccctcct ggggtggcaa 420
tgtcctgggt ctaaatctgt ggcttgtatn gccaacttcn aaangcaaag cttaaaaact 480
tgcncttaac tngggtnaat gtactncccg gcggccgttg aanggcaatt caacacattg 540
cggccgtcta atggntcanc ttggnccaac ttgggnaana tggnaaannn ttcttgggna 600
atttnn 606

<210> 182
<211> 610

<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(610)
<223> n = A,T,C or G

<400> 182
ggtactcata aaaaaagtct taccccaaaa ttgcaaacaa atacattaaa agattagaag 60
aggtgataga aagcaccaga cattaaacaa aataaaaata ataaaataaa ttcaactcaa 120
aaggtcccca ttcagcaaat actttgtaaa gtatggcctg tatgtaaata gtgctaaatc 180
aaggactttt tagcagaaaa ttgctcggtt cttttatcta aggcttgaat ttgtaaagtg 240
aaggcataaa agttaccaaa cattaagtaa ctcttaaaat ggcacacagg ttttaaagct 300
attggttttt ccttcctaac tctctgaatt tttcccatgg cctttgtaga tcaactattt 360
caaacgtatt ttacaccagc aactctcaac atacttgtct ttcagatatg tcatcagtca 420
tgtctaacag gccaatagcc aaataacnga tttaaaacaa tncttaacta gctagcagga 480
cattactttg gatctgctta ctgcaactga ctatttgtaa gcttaaaatc antttaatcc 540
tgatacagaa acctcatctg cncatacntt actttggcct tcaaccttta aaaatactta 600
atcccccgnc 610

<210> 183
<211> 608
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(608)
<223> n = A,T,C or G

<400> 183
cgaggtactt tttttttttt tttttttttt ttttttattt tttttttttt tttttttttt 60
tttttttggg agncagctnt ttaattaggn tcttaaaaca tttaaaacnc caatttgnga 120
ggataaattc cattcgtcan ancaaacnca aatcgcaggt ancccctggan ctgaggaata 180
nctttgattt ttggnaaaat ttgngagtcc acagctttnt gatcaatntt gcnctgctcc 240
gnaatctcat atttctnttt ttctgngncg aaaatctcac cttcctggng tntgggcttc 300
cgcagcttnt tntttttgaa gtaagcatca ataaaangtt ttgggatttt tacattgctg 360
aaatccattt tgggtgaagg ggcaatgaca aatttntngn gtnttctttt taaaagaacc 420
tcattggggg ccnaaggncc cncccaaatt ataaacccct ttccccctgg tttangnaaa 480
ccccccttg ccctgngggg nccangagga taaanaaagg ccccggggaa gctggcccca 540
ntttttcccg ccgncgaagg gttttgccgg ctaaaanttt tngggcattt nnngggnaat 600
tttggctt 608

<210> 184
<211> 622
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(622)
<223> n = A,T,C or G

<400> 184

```
acagccctga tgcaaagttt cagagcatga ccagcaagtg gccagctgtg tgggtcaaga      60
tcagctccag ctgggtctgc ctcctgcttt acgtctggac ccttgtggct ccacttgtcc     120
tcaccagtcg ggacttcagc tgaacctctg agtgccaagg acaccactgg aactcacaaa     180
ggtctccttc accgaaaacc catatacctt ttaagtttgt ttcaactaaa atattaagtg     240
aatgctttgc aagtttgact gtatgcaggt ttatatcaag aaggtgagat tgaataatgc     300
ttgatgcaga atcgaaactt ctcatttatc tgnatattat gtttacttct aaggatatag     360
cacaaaggga acatttttttg tttaaagtga actacagctg tgctgtgaag agagttcttt     420
ataaagcctg taggtctttt aactttggtt aaaatgtaag ataggaaaat gttggatatt     480
tgaggcntgc ctaatatatt tatattggag natcctttna aagccaaaaa aaaaaaaaaa     540
aaaaaaaagt nccttggccg gaccncccta aggggaattc cacncactgg gggccgtntt     600
atggatccaa ctcgnaccaa ct                                             622
```

<210> 185
<211> 614
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(614)
<223> n = A,T,C or G

<400> 185

```
acgcggggac agtcccaccc tcacacgatt ctttaccttt cacttcatct tgcccttcat      60
tattgcagcc ctagcagcac tccacctcct attcttgcac gaaacgggat caaacaaccc     120
cctaggaatc acctcccatt ccgataaaat caccttccac ccttactaca caatcaaaga     180
cgccctcggc ttacttctct tccttctctc cttaatgaca ttaacactat tctcaccaga     240
cctcctaggc gacccagaca attataccct agccaacccc ttaaacaccc ctccccacat     300
caagcccgaa tgatatttcc tattcgccta cacaattctt cgatccgtcc taacaaacta     360
agaggcgtcc ttgccctatt actatccatc ctcatcctag caataatccc atccttcata     420
tatcccaaca acaaagcata atatttcgnc cactaagcca atactttatt gattctagcc     480
ggagacctct nantntaacc tggatcggag gaaaccagta gctacccttt accaatantg     540
ganaagaaga tcgnaccttg gcgggacacc ttangggaat tcaaccactg gnggcggtat     600
atgggacccn ccng                                                      614
```

<210> 186
<211> 627
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(627)
<223> n = A,T,C or G

<400> 186

```
ggtactgatt ttaaaaacta ataacttaaa actgccacac gcaaaaaaga aaaccaaagt      60
ggtccacaaa acattctcct ttccttctga aggttttacg atgcattgtt atcattaacc     120
agtcttttac tactaaactt aaatggccaa ttgaaacaaa cagttctgag accgttcttc     180
caccactgat taagagtggg gtggcaggta ttagggataa cattcattta gccttctgag     240
ctttctgggc agacttggtg accttgccag ctccagcagc cttcttgtcc actgctttga     300
```

tgacacccac cgcaactgtc tgtctcatat cacgaacagc aaagcgaccc aaaggnggat 360
agtctgagaa gctctnaaca cacatgggct tgccaggaac catatnaaca atggcagcat 420
caccagactt naagaattta agggcatctt ccacttttta ccaaaacngn gaacaatctt 480
tttcnttact taacnaacnt gcttccatgg gagccgggng naatccaatc aagggcataa 540
cccgggcctt atttggcnng atgggtcang gnaatancct gaccaggaaa cccctgnttc 600
cttgggggga antttgttgn nccccac 627

<210> 187
<211> 256
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(256)
<223> n = A,T,C or G

<400> 187
ggaccttttt tttttttttt tttttttttt ggaaaagaaa ggccttacat atttattact 60
gaatccagcc aaccaacgtg ttcataacag attcagagag gaaaacacgt cgaaatctcc 120
anatagtggt gacattttca gcttgatatg gtaacatgat cgtgaccttc anacagcata 180
aatatgtgtg ccatctcatg tgcaattcct tatanaccca gcttggttct tctccaatgt 240
ctccttttgg agttgt 256

<210> 188
<211> 523
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(523)
<223> n = A,T,C or G

<400> 188
ggtaccacct acacccaaca agtcaatgag ggacttcttt ttaatttggt aggattttga 60
ctggttttgc aacaataggt ctattattag agtcacctat gacaaaaaat aggggttacc 120
tagataatgc caaagtcagc atttgtcctg ggttcccttg tgtgatctgt ttggactatg 180
ttttcttttc ttctcccact tgctcagcag cttgggcttc cattctagct cttttaccaa 240
gatttttgtg tgaccatgtt gacttcattt ggattgccct ctttcaattt ccttgtgaaa 300
acacccttaa ctttctcttt acccttagct gaaatgttta cataacttct ggtgatatct 360
tttcatgatt ttatatctct taaaatggtg atggatgtga cacctcataa aagtgagctt 420
tgaactgtag ataactctta aagaaaatgt cattttanac aattaaaata tttgtgctca 480
aaaaaaaaaa aaaaaaaaaa gtcctgcccg gcggccgtcn aan 523

<210> 189
<211> 622
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(622)

<223> n = A,T,C or G

<400> 189
acaatttaat ttttctgctt gcccaagaaa caaagcttct gtggaaccat ggaagaagat 60
gaaaatgaga ctggcaaaga acaaatgctg aatctgaaga agaggacaac tttgggcaaa 120
taatctgcat acttttaatt gggaataaga tggaaaatat gaatgctaaa tcaaattttt 180
taaaaaatac accacacgat acaactcaat acaggagtat ttcttctcaa attcttctag 240
caccatcaac attcttcaag tatctgaaat actattaatt aagcaccttt gtattatgaa 300
caaaacaaaa caaggacctc agttcatctc tgtctaggtc agcacctaac aatgtggatc 360
acactcatgg gaaagtgttt tgaggtagtt taaacctttt ggaaggttgg gttttaaact 420
tccctctgtg gaagatatca aaagccccaa gtggtgccaa atggttatgg ttttattttt 480
caattttaat ttgggtttct tccaaaggtg acatttccat acaaggggaa gggggtggaa 540
aaaaaatcaa attttggggg accagggagg ataatnaact gtttgcaatg cttgacaacc 600
ttttttttt gnccaantaa ca 622

<210> 190
<211> 628
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(628)
<223> n = A,T,C or G

<400> 190
accactaata gggtgtatct cagaaactga attgaaataa gggaaaatag gattttctgt 60
cctggttttt gaagattgtt cttgattccc ttgattccca ggagagattc tctgacattc 120
acgtgtcagc cactttggca cggaagcctt acagtgtggg gaaccaaaac ttcgtgtctc 180
ctctttcccc gatgccatca gcatagactt gacttcctta aaccgagagt tttgatgtgg 240
ccttggcaac cctaaaatca gctgtgttag gtaacaaaac tcaggctttc tgttgatgac 300
atcgagatgg tgtcacttaa aagagccaag attcctgttt tcagtttgtg gattcatcct 360
gctggtttta ctttagtccc tccatgtcaa agtgggcctg agaaaagctc atacatgcct 420
catgtgaagt gtccaccccc tctgaaaatc tttcttgttc aaaacancna cgacatatct 480
tggtaacttt tacggtgact tttggangag gggagtttgg aaattgtaaa atgttatana 540
tggtgcctat ttcctgctga angaaatgtt ttaaaaagnn tntntaancn taatcnaatg 600
gttgggggn gaccttctac cnaanntn 628

<210> 191
<211> 474
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(474)
<223> n = A,T,C or G

<400> 191
ggtacagccc tcaatctgtt cttcaagctc aagaacttca agacagctgc cacctttgct 60
cggcgcctac tagaactcgg gcccaagcct gaggtggccc aacagacccg aaaaatcctg 120
tctgcctgtg agaagaatcc cacagatgcc taccagctca attatgacat gcacaacccc 180
tttgacattt gtgctgcatc atatcggccc atctaccgtg gaaagccagt agaaaagtgt 240

```
ccactcagtg gggcctgcta ttcccctgag ttcaaaggtc aaatctgcag ggtcaccaca     300
gtgacagaga ttggcaaaga tgtgattggt ttaaggatca agtcctctgc agtttcgcta     360
aagccccctt tgtgtgcatg ggtcaagtca ccatatgttc cccccaaaaa atgtgtctat     420
atctccttct aacaacacct tcccctgcac tactcttcaa atctngctct ntgt           474

      <210> 192
      <211> 234
      <212> DNA
      <213> Homo sapiens

      <400> 192
acgcgggggt tggtgagtgg gctcctaccg accgaggttt aggcagcgcg gggagctttg      60
cgggttgcca tttgtaactc cggatcctaa aattcctgtc ctgttctctg tctcttctag     120
gttgggggcc gtcccgctcc taaggcagga agatggtggc cgcaaagaag acgaaaaagt     180
cgctggagtc gatcaactct aggctccaac tcgttatgaa aagtgggaag tacc           234

      <210> 193
      <211> 367
      <212> DNA
      <213> Homo sapiens

      <400> 193
ggtaccaata ccaccaattt tgtagacatc ctggagaggc aggcgcaagg gcttgtcagt      60
tggacgagtt ggtggtagga tgcagtccag agcctcaagc agcgtggttc cactggcatt     120
gccatcctta cgggtgactt tccatcccctt gaaccaaggc atgttagcac ttggctccag     180
catgttgtca ccattccaac cagaaattgg cacaaatgct actgtgtcgg ggttgtagcc     240
aattttctta atgtaagtgc tgacttcctt aacaatttcc tcatatctct tctggctgta     300
gggtggctca gtggaatcca ttttgttaac accgacaatt agttgtttca cacccagtgt     360
cccgcgt                                                               367

      <210> 194
      <211> 613
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(613)
      <223> n = A,T,C or G

      <400> 194
ggtactcttg gtttgtcaat gggactttcc agcaatccac ccaagagctc tttatcccca      60
acatcactgt gaataatagt ggatcctata cgtgccaagc ccataactca gacactggcc     120
tcaataggac cacagtcacg acgatcacag tctatgcaga gccacccaaa cccttcatca     180
ccagcaacaa ctccaacccc gtggaggatg aggatgctgt agccttaacc tgtgaacctg     240
agattcagaa cacaacctac ctgtggtggg taaataatca gagcctccgg tcagtcccag     300
gctgcagctg tccaatgaca acaggaccct cactctactc antgtcacaa ggaatgatgt     360
aggaccctat gagtgtggaa tccanaacga attaagtgtt gccacagcga cccagtcatt     420
ctgaatgtcc tctatgncca gacgaacccc catttcccct cataccctan taccgtcaag     480
ggtgaacctt agctttctgc atgcagcttt aaccactgcc agtttcttgn tgatgatgga     540
catcacacca cacaagactn ttatttcaca tactgagaan aaagcgactt ntactgcagg     600
cataactanc ngg                                                        613
```

<210> 195
<211> 613
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(613)
<223> n = A,T,C or G

<400> 195
acgcgggcgc cagagtccct gaactctcgc tttcttttta atcccctgca tcggatcacc 60
ggcgtgcccc accatgtcag acgcagccgt agacaccagc tccgaaatca ccaccaagga 120
cttaaaggag aagaaggtga tggtgaggaa gaggatggag atgaagatga ggaagctgag 180
tcagctacgg gcaagcgggc agctgaagat gatgaggatg acgatgtcga taccaagaag 240
cagaagaccg acgaggatga ctagacagca aaaaaggaaa agttaaacta aaaaaaaaaa 300
aggccgccgt gacctattca cccttcactt tccgtctnaa aatctaaacg tggtcacctt 360
caataaaaag gcccccccgcc cccngggcag tgcccccccca aaataaacgc gctttcacca 420
ccaaccaaac atgaaaattt tccacaaggg anggaaaaaa aaccaaacnt ccaaggcctn 480
ttttttttta aaatactngg ccgcgaccac cctanggcga attccanacc tggcggccgt 540
nttatggatc cnactcggac caacttgggn aatatggcat antggttctt ggngaaatgt 600
atccctccat tcn 613

<210> 196
<211> 296
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(296)
<223> n = A,T,C or G

<400> 196
gcggnggcnn ggccgacgnn ctcatcaatg ttgttcggtc agcccttccc taattacacc 60
tatccnctac acatacatgc acatagacac acncntgaac ncactgaana tatttccttc 120
aggtgtgtgt aaaatatgct gcttggattg aaattcannt gggattgatt agncaagtan 180
cttganacct cacagtaatc ttcacacttn nccttacaca cctatgcagg catgttggga 240
gcangttaca atgttacttc agcccacagt ttatttctat acttgagttc ttaagt 296

<210> 197
<211> 222
<212> DNA
<213> Homo sapiens

<400> 197
acatggagga gaatgaccag ctcaagaagg gagctgctgt tgacggaggc aagttggatg 60
tcgggaatgc tgaggtgaag ttggaggaag agaacaggag cctgaaggct gacctgcaga 120
agctaaagga cgagctggcc agcactaagc aaaaactaga gaaagctgaa aaccaggttc 180
tggccatgcg gaagcagtct gagggcctca ccaaggagta cc 222

<210> 198
<211> 539

<212> DNA
<213> Homo sapiens

<400> 198
cgaggtacta catatttcag cactaaggcg gttgcttcac tttatatcta tataaaaaaa 60
gtggtaaaaa tcttttcctt ttgtgcagtt gaacccatcc tacattcaga ttctctcaag 120
cactaataaa atacttattt ggttgaggaa gatttaaggc aagttcgggc ccttccaaag 180
gcactgtgag actccccccc cactccccgt tattgctaca tgtctttata ctcgagtatg 240
tcacagtaga actggtggaa taagcaaaca ctttttttgct agtttataaa gttggaatta 300
gaaaagcatg ccacatttca gcctgattgc aaagtatgtg gtcatttttt tctttgaagt 360
tggatgggct acaaccttta tacattctaa gaaaactcat aggatgttcc tcaaactact 420
tccacagcat caagatcgat ttctgtcaag aaatcatgca atctttcaaa atttacgtaa 480
acaaggaaag aaattaatga aataaatatt acatacaatc tcttaaatta agaatttgt 539

<210> 199
<211> 626
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(626)
<223> n = A,T,C or G

<400> 199
cgaggtacaa gatgtccaaa tattgcgaag atctatttgg ggatctcctg ttgaaacaag 60
cacttgaatc acatccactt gaaccaggca gggctttgcc atccccccaat gacctcaaaa 120
gaaaaatact cataaaaaac aagcggctga aacctgaagt tgaaaaaaaa cagctggaag 180
ctttgagaag catgatggaa gctggagaat ctgcctcccc agcaaacatc ttagaggacg 240
ataatgaaga ggagatcgaa agtgctgacc aagaggagga agctcacccc gaattcaaat 300
ttggaaatga actttctgct gatgacttgg gtcacaagga agctgttgca aatagcgtca 360
agaaggcttc agatgacctt gaacatgaaa acaacaaaaa gggcctggtc actgtagaag 420
atgagcaggc gtggatggca tcttataaat atgtaggtgc tccactaata tccatncata 480
tttgtccaca atgatcaact acgcccacct gtaaaggttc aaggttncat gtggcagaag 540
aaccncatat tcattataca tggcttcttt tatgaatant cggccttggt tcttgaancc 600
cttgcaatga atttgnaatt ntacca 626

<210> 200
<211> 618
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(618)
<223> n = A,T,C or G

<400> 200
actcataaaa aaagtcttac cccaaaattg caaacaaata cattaaaaga ttagaagagg 60
tgacagaaag caccagacat taaacaaaat aaaaataata aaataaattc aactcaaaag 120
gtccccattc agcaaatact ttgtaaagta tggcctgtat gtaaatagtg ctaaatcaag 180
gactttttag cagaaaattg ctcggttctt ttatctaagg cttgaatttg taaagtgaag 240
gcataaaagt taccaaacat taagtaactc ttaaaatggc acacaggttt taaagctatt 300

```
ggtttttcct tcctaactct ctgaattttt cccatggcct ttgtagatca actatttcaa     360
acgtatttta caccagcaac tctcaacata cttgtctttc agatatgtca tcagtcatgt     420
ctaacaggca aatagcanaa taacagattt aaaacaatcc ttaactanct agcaggacat     480
ttactttgga ttctgcataa ctgcaaactg acatatttgt aaagctaaaa atcagtttaa     540
tcntgattac agaaactcta tcatgctcat tacttaacta ttgnccttca atcgctattn     600
aaattcactt aatccaat                                                   618
```

<210> 201
<211> 627
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(627)
<223> n = A,T,C or G

<400> 201

```
ggtactaggc acaatagaac atacagaaaa cattgtccct gctcttgagg agcttacatt      60
ctaaaagaaa aaatacacct tttttaaaat ggcatttttg tttggtgttt tctgcaaagt     120
acgcggggct ttttcttttt gaggaagacg cggtcgtaag ggctgaggat ttttggtccg     180
cacgctcctg ctcctgactc accgctgttc gctctcgccg aggaacaagt cggtcaggaa     240
gcccgcncgc aacagccatg gcttttaagg ataccggaaa aacacccgtg gagtcggagg     300
tggcaattca ccgaattcga atcaccctaa caagccgcan cgtaaaatcc ttggaaaagg     360
tgtgtgctga cttgataaga ggcncanaag aaaagaatct canagtgaaa ggaccaagtt     420
ngaatgccta ccaagacttt gagaatnact acgaganaaa ctccttgtgg tgaaggtcta     480
agacgtgggn tngnttccag atgagaattc acaagcgact tattgacttc acaagtcctt     540
ntgagattgt tangctgatt acttccttna ntatganccn ngaatttaag ngggangtna     600
ccntncagan gnttagttna ctatttt                                         627
```

<210> 202
<211> 620
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(620)
<223> n = A,T,C or G

<400> 202

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actgcttaac gaaacactat cagcttgttt taaatggatc ttttaaatat caactgtagc      60
ctggttggct aattctttct aatcttcccc attactttcg cctagatttc ccatagatca     120
acaggcatag taaaatgcct catcagaaca cacttctcca cacaattcaa aaagggagct     180
cctgtgggct caaagcaacc atcagtccag caatgcccat gatttatctg aaactgcttc     240
ccaagagaca ggagtgcaga tctgagtagc tgtgctgcca atacagatag gtttagcact     300
agatatttag tgattgtggc aaggaagaat cggtgatgat gggggtggtg ggtgaaggaa     360
gggccagggg atctgaagga tcttcagttg ccttctcctg cttcttcatc ctgctggtcg     420
ctcgtccana gggtgaggtt gtctcgcagc aactgcatga tcagcgtgga gtccttatag     480
gaatcctcgt ttagtgtgtc cagctcagct atggcatcat cgaaggcttg tttggctaaa     540
agcangcttg ctcangtgca ttctggatct catagtagaa caccggagaa ntganggcca     600
ggcccaaccg gatnggatgc                                                 620
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<210> 203
<211> 577
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(577)
<223> n = A,T,C or G

<400> 203
ggtacttttt tttttttttt tttttttttt tttttttttt tttttttttt tgaaaaagtc 60
atggaggcca tggggttggc ttgaaaccag ctttgggggg ttcgattcct tcctttttttg 120
tctaaatttt atgtatacgg gttcttcnaa tgtgtggtag ggtgggggc atccatatag 180
tcactccagg tttatggagg gttcttctac tattaggact tttcgcttcn aagcgaaggc 240
ttctcaaatc atgaaaatta ttaatattac tgctgttaga naaatgaatg ancctacaga 300
tgataggatg tttcatgtgg ggtatgcatc ggggtantcc gagtaacgtc ggggcattcc 360
ggataggccn agaaagtgtt ntgggaanaa agttagattt accccgatga atatgatagt 420
gaaatggatt ttggcgtagg tttggtctag ggtgtancct gagaataggg gaaatccgtg 480
aatgaaacct cctatgatgg caaatacact cctattgnta ggacataatg ngaagtgagc 540
tacaaccgta atacctgccc nggcnggccc ttannan 577

<210> 204
<211> 629
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(629)
<223> n = A,T,C or G

<400> 204
cgaggtactt gttttttttt ttttttttga gacggagtct cagtctgtca cccaggctag 60
agtgcagtgg cacgacatcg gctcactgca acctccgcct cccgggttca agtgattctc 120
ctgcctcaac ctcccgagta gctgggacta caggcatgtg ccaccacgcc tgactaattt 180
ttgtattttt agtanagatg ggatttcatt atgttggcca gctggtcttg aacttctgag 240
ctcaggtgat ccacccgcct tagcctncca gagtgctagg ataacaggca tgagccgtcg 300
cgcctggcca aaatagcata atgttttaag aaagtttacg aatttgtctt gggccacatt 360
naaaaccatc atgggccaag ggttggacaa gctagcctta ggtcatgtca gaatgcaatt 420
taacaggaat ttcaagcnaa acttacaaaa aattaaatcc acaaaaaaaa tatcatttgg 480
taaatgcact gnctacacac tttactncta agtccattca accatgacga ccctttacat 540
aaaaattagg gcattctccc aagttctaaa gatgatttct aaaacattac caangnctaa 600
agtctaattc ccacaaanca ttttttttn 629

<210> 205
<211> 424
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(424)

<223> n = A,T,C or G

<400> 205
ggtacaaatg cttttatatt cagcccctgt aaagccatca gatgtttgaa agtttttaaa 60
cacgaaccaa agggtttaat tttaagaact tagctaggaa tgggtgaaat cctacccaat 120
taatagagtt ctgcaaatta gtaacaaagt gtaaaatgaa aggaagggtc ccttggagat 180
gtgaaattct tctattgaga gtcctgtctt ctttattcaa gaagtttgta gccattttca 240
gaattcactc aagaaccaac ttcttaattt agatatcagc gaacaagtca tggcaaaaaa 300
tacacaaaga gaaacaccac cacatcgaaa aggatgaaaa gccagaggtc caaccagtan 360
gagtgtttgg gaagcccatt tgccccagac tgaggcctca catcgaagtt ctgcctcccc 420
gcgt 424

<210> 206
<211> 633
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(633)
<223> n = A,T,C or G

<400> 206
ggtaccaatg gtgcctcctg gaatcaagta tctttacctt aggaataacc agattgacca 60
tattgatgaa aaggcctttg agaatgtaac tgatctgcag tggctcattc tagatcacaa 120
ccttctagaa aactccaaga taaaagggag agttttctct aaattgaaac aactgaagaa 180
gctgcatata aaccacaaca acctgacaga gtctgtgggc ccacttccca aatctctgga 240
ggatctgcag cttactcata acaagatcac aaagctgggc tcttttgaag gattggtaaa 300
cctgaccttc atccatctcc agcacaatcg gctgaaagag gatgctgttt cagctgcttt 360
taaaggtctt aaatcactcg aataccttga cttgagcttc aatcagatag ccagactgcc 420
ttctggtctc cctgtctctc ttctaactct ctacttagac aacaataaga tcagcaacat 480
ccctgatgaa gtatttcaag cgtttaatgc tttgcagtat ctgcgtttat ctcacaacga 540
actggctgat agtggaatac ctggaaattc tttcaatggn gccatcctgg gtgaacctgg 600
acttgcctat accagcntaa aacataccac cgg 633

<210> 207
<211> 623
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(623)
<223> n = A,T,C or G

<400> 207
ggtacttttt tttttttttt tttttttttt ttagaaacta tggctcttta ttttcatgtg 60
gataattcaa acaaagtcat tagtagtctt tgttcaattt ttttttaaaa aacaaaaaaa 120
ccctcaaata aaaaatcttg ggcttaaaag aactctatca caggagcctg gttggaggat 180
tcctagtttt atacatgaga aatagaatgc agatttctct gaagagtgtt taaagaagga 240
atggtagttg aggggggctta tttcccaggc tcaaagtgat ttaggggtgg tgtcacagtg 300
ctaggtatag ggtgatggac agtgatcact gccgagggcc ttggaacgga tcttgctgtc 360
acacaatgca ggtaacagag agtgggacaa caaaaagtaa tcaaggcgcc aaccaacatt 420

cttggatcga gcattcatat ataagtccaa aaggtgtang cataaggtgt gttggggtan 480
aagtgcctaa agctgcaacc agtggcacan cctgcagtaa ttccccgaac cttggccttt 540
tggggcgtga anccnccatt cttttggtnc cctnggggtg cnaaggcaat ttttnatgtg 600
cccattgagg gttcaaacac aca 623

<210> 208
<211> 620
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(620)
<223> n = A,T,C or G

<400> 208
acgatgtcta gtgatgagtt tgctaataca atgccagtca ggccacctac ggtgaaaaga 60
aagatgaatc ctagggctca gagcactgca gcagatcatt tcatattgct tccgtggagt 120
gtggcgagtc agctaaatac tttgacgccg gtggggatag cgatgattat ggtagcggag 180
gtgaaatatg ccccgcgtac ttgctttgaa agattaccta ctattttatg ataaaatgta 240
gttgtctcca gagcttaaat ataatttgta aagcacttgg tttaaatttc tctctaccta 300
taaacagttt agcattaagg gtttctatta atgacacaga attattggcc aagtgtaatt 360
tcttaaaatt tagcattact ttaaatagcc agcatgtaat acaagtaact acactacctc 420
atatctacat gattttcaag ttgtaatgca gatggacaga taaaaaagat ttacgttgnc 480
ttttggccat aagtgggaaa agttttctgn atattgcata gcattacaca tttatgccta 540
ttttacatta acttctaaag aagtttttct aagaaaangg ttcaggcaat atttttgag 600
gctgccgaan aaaaatgant 620

<210> 209
<211> 624
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(624)
<223> n = A,T,C or G

<400> 209
ggtactggta caaaaacagg cacataaacc aatgaaacag aatagaaagc ccagaaataa 60
tgcttcaccc ccacaaccat ctgatcttca acaaaataaa caaaaacgag ccatggggaa 120
aggactccct attcaataaa tggtgctggg ataactagtt aaccatatgc agaagattaa 180
agctggaccc cttccttaca aaataaggag ctggacccct tatacaaaaa tcaactcaag 240
atggattaaa gccttaaatg tgaaactata aaaccctgga agacaacata ggcgattcca 300
ttctagacat cagaactggc aaagatttca tgaggaagac accaaaagca attgcaacaa 360
aagcaaaaat tgacaactgg gatataatta agtttaagag cttctgcaca gcaaaagaga 420
gactatcagc agagtaaaca gaccacctac agaatgggag aaaatatttg caaactatgc 480
atgtgacaaa ggtctaatat ctagcatcta taagtactta aacaaatttc aacagaaaac 540
caacacccca ttaaaaagtg ggcaaggaca tgaacaaatg cctttcaaaa gaagacatct 600
gcttntacag tttntgaaac aaag 624

<210> 210
<211> 504

<212> DNA
<213> Homo sapiens

<400> 210
acgcggggca gctagcagat gctttaggac ctagtatctg catgctgaag actcatgtag 60
atattttgaa tgattttact ctggatgtga tgaaggagtt gataactctg gcaaaatgcc 120
atgagttctt gatatttgaa gaccggaagt ttgcagatat aggaaacaca gtgaaaaagc 180
agtatgaagg aggtatcttt aaaatagctt cctgggcaga tctagtaaat gctcacgtgg 240
tgccaggctc aggagttgtg aaaggcctgc aagaagtggg cctgcctttg catcgggggt 300
gcctccttat tgcggaaatg agctccaccg gctccctggc cactggggac tacactagag 360
cagcggttag aatggctgag gagcactctg aatttgttgt tggttttatt tctggctccc 420
gagtaagcat gaaaccagaa tttcttcact tgactccagg agttcagttg gaagcaggag 480
gagataatct tggccaacag tacc 504

<210> 211
<211> 619
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(619)
<223> n = A,T,C or G

<400> 211
accatgaaat atccagaaca tacttatatg taaagtatta tttatttgaa tccacaaaaa 60
acaacaaata atttttaaat ataaggattt tcctagatat tgcacgggag aatatacaaa 120
tagcaaaatt gaggccaagg gccaagagaa tatccgaact ttaatttcag gaattgaatg 180
ggtttgctag aatgtgatat ttgaagcatc acataaaaat gatgggacaa taaattttgc 240
cataaagtca aatttagctg gaaatcctgg atttttttct gttaaatctg gcaaccctag 300
tctgctagcc aggatccaca agtccttgtt ccactgtgcc ttggtttctc ctttatttct 360
aagtggaaaa agtattagcc accatcttac ctcacagtga tgttgtgagg acatgtggaa 420
gcactttaag tttttcatc ataacataaa ttattttcaa gtgtaactta ttaacctatt 480
tattatttat gnatttattt aagcatcaaa tatttgtgca agaatttgga aaaatagaag 540
atgaatcatt gattgaatag tattaagatg tatagtaaat tatttatttt ananattaaa 600
ngangtttat taganaaan 619

<210> 212
<211> 479
<212> DNA
<213> Homo sapiens

<400> 212
cgaggtacaa agcagcaact gcaatactca aggttaaaac attagaaaag catttgtgtg 60
acaggtatat tacagtatta tcaaaatatt acattttcag acttacttag cagataatca 120
tccaccagag cttaaatctt taaattattt ccatagtctt aaaaaatatg taatgtcaga 180
atgcatataa aaagaatgta aaaggaaacc taaaatacaa atggaataat gtaacaaata 240
aatatttgat ttcagtaact gttaataatc agctcaacac caccattctc tctaaactca 300
atttaattct tataggaata atgaactgtc aaatgccatg gcataattat ttatttccaa 360
gctatcatca atgattagaa ctaaaaaaat tttggcataa aaaaatcaca attcagcata 420
aataaagcta tttttagctt caacactagc tagcatctct aagaattgtt gaaataagt 479

<210> 213

<211> 487
<212> DNA
<213> Homo sapiens

<400> 213
actgtttact gcctgggcac tatactttct atgcagatct cctttgtggg tttccagcct 60
gtcctttcat cagagcacat ggcagccttt ggggtctttg gtctctgcca gatccatgcc 120
tttgtggatt acctgcgcag caagttgaat ccacaacaat ttgaagttct tttccggagc 180
gtcatctctc tggtaggctt tgtccttctc accgtgggag ctctcctcat gctgacagga 240
aaaatatctc cctggacggg gcgtttctac tcactgctgg atccctctta tgctaagaac 300
aacatcccca tcattgcttc tgtgtctgag catcagccca caacctggtc ctcatactat 360
tttgacctgc agctcctcgt cttcatgttt ccagttggcc tctattactg ctttagcaac 420
ctgtctgatg cccggatttt tatcatcatg tatggtgtga ccagcatgta cctcggccgc 480
gacacgc 487

<210> 214
<211> 393
<212> DNA
<213> Homo sapiens

<400> 214
cgaggtacaa tatgctgcag cataatttgt caggccaacc ttcacaccat attttggcag 60
ttcgtgtgca tacgctgcgc agactatcat atccccctct atacgggcat aagcaatctg 120
acaaatgata tctctgtttg tcacacgaac tatcatcctg tatttgggtg tgttgtattt 180
atttttatct tgtatcacca agcgtttccg agcataataa tcagttttac cctctcgtcg 240
tcttctaaat ttcacttggt atctcttaaa gtaggcctta ttcttaacaa ctttaacaaa 300
ccccatcctg cggaacagag accggcgtcc gctgctcgac agagacctgc aggcccagcg 360
gcgctagggg gtgggaaaag ggccaccccc cgt 393

<210> 215
<211> 615
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(615)
<223> n = A,T,C or G

<400> 215
ggtacagtaa caagtgttgg cattatcagt tgaactgtaa atacaaaatg cttcttccaa 60
ttagtctcta tgatgattaa gtttctaaaa tttatctgaa caccattcag aaacttgttt 120
tggggaattt gatagttatt gatgtgcatc tgttaaactg atgacagaca taactcatca 180
ttccccagaa accttttttg attacagtat ctaacatttt gcctcctctt ttttggtttt 240
gctggttata aaggtttgga ttggagaggg ctcactggat cccaatcctt ggagctggat 300
cattggattc aaatcataat gtggatagga tagggaggat gaattaccag gattcatgga 360
gcgggatcag attaccagga acataggagt ggattcctgc ccaaccaaac ccgcattcgt 420
gtggattttt ttattcaact taattggcta ttccaaagat tttttttcc tatttttgac 480
gaatggagcc cttaagatgc acgatggaat tgggtttgcg tttttggtaa aaggaccaaa 540
ccaggcctgg agataacgct ggagcaatct cntggaagga ttagccccaa ttgatgggaa 600
catttaangg ggaag 615

<210> 216

<211> 322
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(322)
<223> n = A,T,C or G

<400> 216
ggtacttttt tttttttttt tttttttttt ttttttggag ttgtaggcaa atgtttaatt 60
aattctgctc atatgcacat ctgaaagcat gagacacact ccacagacag cacgcactgg 120
ggctggtggg gcanatgggc actcgccgat taggtattaa tgtcaataat acgtgcataa 180
agtgctgata aaataactta agtgttacaa aaagagacag tccacggtgg ctgcaggcac 240
atgcaggcgg gactgggtca aacactccag ggctgcacat gttccagctg gcctgagtcc 300
gacacgtcat aactggcctt gt 322

<210> 217
<211> 606
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(606)
<223> n = A,T,C or G

<400> 217
acgcgggggg aagtgagcga cacactctgc gtcctcgcct caccagagtc ttgctgtgtg 60
gcccaggctg gagtgcccgg ctggtctcaa attcctgacc tcaagtgatc tccctcccaa 120
agtgttgcga ttgcaggtgt gagccactgc acctggctgc tgagaaatct ttgcctacag 180
tgagggaaac tactaaagtt cctggggaag caaagtaaga atttcataag aacaaaatgg 240
atggagagga gaaaacctat ggtggctgtg aaggacctga tgccatgtat gtcaaattga 300
tatcatctga tggccatgaa tttattgtaa aaagagaaca tgcattaaca tcaggcacga 360
taaaagccat gttgagtggc ccaagtcaat ttgctganaa cgaaaccaat gaggncaatt 420
ttagagagat ccttcacatg tgctatcgaa agtattcatg nattttacgt accttgggcc 480
gcgaccacct taaggccaat tncacacact ggcnggccgt actantggat ccnactngga 540
ccaacttggc gtaatcatgg catactggtt cctggggaaa atgtatccgt tacaattcnc 600
acacan 606

<210> 218
<211> 618
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(618)
<223> n = A,T,C or G

<400> 218
ggtacttttt tttttttttt ttttttttga gacggagttt ggcccttgtt gcccaggctg 60
aagtgcaata gtgcgatctc ggctcactgc aacctccacc ttccgtgttc aaccgattct 120

cctgcctcag cctcctgagt agctgggatt acagatgaaa aaacatttaa agcccttaag 180
gaagaaggaa atcaatgtgt aaatgacaaa aactataaag acgccctcag taaatacagc 240
gaatgcttaa agattaacaa taaggaatgt gccatatata caaacagagc tctctgttac 300
ttgaagctgt gccagtttga agaagcaaag caggactgtg atcaggcact tcagctagct 360
gatgggaacg tgaaagcctt ctatagacga actctggctc ataaaggact caagaattat 420
cagaaaagct taattgatct caataaagtt atcctactag atccaagtat tattgaggca 480
aagatggaac tggaagangt aactagactc ctaatcttaa ggataagaca gcaccattca 540
acaaagaaaa ggagagaagg aaaatgagaa tcaagaggng aatgaaggca ngaggancct 600
ggaaaacctg aggggagg 618

<210> 219
<211> 613
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(613)
<223> n = A,T,C or G

<400> 219
ggtacaaagc ggatctgagc ccggaaaatg ctaagctcct cagcacattc ctaaatcaga 60
ctggcctaga cgccttcctg ctagagctgc acgaaatgat aatcttgaaa ctaaagaacc 120
cccaaaccca aaccgaggag cgcttccgcc ctcagtggag cctgagagac actctcgtaa 180
gttacatgca aactaaagaa agtgaaattc ttcctgaaat ggtatctcag ttcccagaag 240
agatactgct cgccagctgt gtctcagtgt ggaaaacagc tgctgtgctg aaatggaatc 300
gagaaatgag atagaattat ttcctcagct atctttggat gactttggag agaagactcc 360
tctctcctcg tctgcggcgt ggacttgatc atggactggt gcctttgcat tcagaaggag 420
agctgtcagc gtagcaccga attcaagacc aaggcgtgct acctgagctg acagcttttt 480
gaaagccgag ctggttctga accatgtcct gcccnggcng gcgctcgaaa gggcgaattc 540
agccactggc ggccgtacta ntggatccga actcggacca aacttggcgt aatatgggca 600
tactggttcc tgg 613

<210> 220
<211> 616
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(616)
<223> n = A,T,C or G

<400> 220
ggtacgcggg ggcagccgcg gtgttgtgct gtggggaagg gagaaggatt tgtaaacccc 60
ggagcgaggt tctgcttacc cgaggccgct gctgtgcgga gacccccggg tgaagccacc 120
gtcatcatgt ctgaccagga ggcaaaacct tcaactgagg acttgggga taagaaggaa 180
ggtgaatata ttaaactcaa agtcattgga caggatagca gtgagattca cttcaaagtg 240
aaaatgacaa cacatctcaa gaaactcaaa gaatcatact gtcaaagaca gggtgttcca 300
atgaattcac tcaggtttct ctttgagggt cagagaattg ctgataatca tactccaaaa 360
gaactgggaa tggaggaaga agatgtgatt gaaagtttat cangaacaaa ccgggggtca 420
ttcaacagtt tanatattct ttttaatnnt ttcttttncc tcaatccttt tttattttta 480
aaaatagttc ttttgtaatg tggtgtcaaa acggaattga aaactggcac cccatctttt 540

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gaaacatctg gtaatttgaa tctaatgctc attatcatta tggttggttt cattggcnga    600
attttgggga tcaanc                                                    616

      <210> 221
      <211> 615
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(615)
      <223> n = A,T,C or G

      <400> 221
ggtacagtga tagctccccc tgggcaatac aatacaagaa cagtgggttt tgtcaaattg     60
gaacaaggaa acagaaccac agaaataaat acattggtta acatcagatt agttcaggtt    120
actttttgt aaaagttaaa gtagaggga cttctgtatt atgctaactc aagtagactg      180
gaatctcctg tgttcttttt tttttaaatt ggttttaatt ttttttaatt ggatctatct    240
tcttccttaa catttcagtt ggagtatgta gcatttagca ccactggctc aatgcgctca    300
cctaggtgag agtgtgacca aatcttaaag cattagtgct attatcagtt accaccattt    360
ggggctttta tccttcatgg gttatgatgc tctcctgatg acacatttct ctgagttttg    420
taattccagc caaagagaga ccattcacta tttgatggct ggctgcatgc agacatttaa    480
agcttttaga gaatacacta caccagggag tatgactact antatgacta ttagganggt    540
aatacccaga attggactcg caccttaggc aagatccaac cactaaattg aataagaatg    600
agtngatgag gtncc                                                     615

      <210> 222
      <211> 617
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(617)
      <223> n = A,T,C or G

      <400> 222
ggtacttttt tttttttttt tttttttttt ttttaattta tgattttatt gnctttcctt     60
tgtccggcct ttaacatgtt tctgtaattt aaataaaaat ctatttactt tctccatttt    120
agcaaatggt ttctttaccc aaataggttg cactatagtc cccatatggt tttctactgn    180
tccacaacca ctatttcaca aagattgaca aaactttaat aaaagttaaa tttacagaca    240
tcttaagata acttgggaaa tatgtagtaa aaaagaatcg agtccacaaa ttaagaatat    300
tttgctaata tgcccaacac caatttcagc aaatccaatc tacttaactc atatatttaa    360
tgnggtaatt tttctaacaa aatttaatgg gggtatgaat gatatattta tgcccttgac    420
aaagatgaca tgtgtgattt tggtgngact aanaaaggag aagtatgatt tctggngggt    480
atganatcac tctggctcat cgaagctcca gaatatgtaa gggtctgnca cgtccaaaaa    540
tgttaggcna atgtataaaa ggccacccgg ctnacacacg ttttatatac aaactttngn    600
agtcctttta tntcata                                                   617

      <210> 223
      <211> 470
      <212> DNA
      <213> Homo sapiens
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<220>
<221> misc_feature
<222> (1)...(470)
<223> n = A,T,C or G

<400> 223
ggtaccacaa ctgtgccctt gataattagt aatcactcct aaaaatcttc atttggcacc 60
agatggtgtg tttaaaacac cctaggatgt tttgaatcag gcttgatttt gttagttgag 120
ttacaggaga atttaaggg tgagggtatg ggggtcaggg aagaaaagga aatgggaaat 180
ggaccagaaa aaatcttgag tcatcatcta aatcaacaaa gcactgatag ctccaaatat 240
taggtcagac actaaaacga ctgatatagg ctcaagtggt ttataaaacc tataaaaaga 300
ctacaccagc aaagtccctg tcaatctgtc agagttcaga aactaaaaca gggagtaaca 360
ttttagctta aaaccttatc tcaagagaat catatacact tcacatgaat aaaaatacct 420
gaaaccaaac atttttaaaa gctccagtcc tgcccnggcc ggccgctcga 470

<210> 224
<211> 622
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(622)
<223> n = A,T,C or G

<400> 224
gcgtggncgc ggccgacgtn ctcttttttt tttttttttt ttttttgcnn actaaaaatn 60
ngattgctct ttaaagcctt aggccgnatg acaaaatgan nagactgaaa tgacancggg 120
gaggaagaaa cagannaaag ataagaatga ggtggtcagg ttgggggaat taagcgaata 180
ttcncttccn nggtgagtcc tnacactggt ctcatgccca tgatgagttg cacaccaaac 240
acnggctgnt gacttncctc ctgcnctant cagtgaactt gcngacatng ggnancctca 300
cattacagnt ataannttc cacctaaaaa atgctgcgct tttcgacngg ctcnnncagn 360
ggccggggct tgacatggng gaanggattt ctctcccatg ccaaggaatt catcacatca 420
ctgntactcc actgncaacc ttntccattg ggctcngtgc cctgtgtngg gtcatggacc 480
cantccanaa ntatgaatac tgtaccatgc tcttaaccag gaggacctaa ggatccttag 540
ncccntgagn nanacaccag gnttcaaagg ccgttttggn aagccaaatt tgnttnggnc 600
cgaattnggg ccaaacangg tt 622

<210> 225
<211> 619
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(619)
<223> n = A,T,C or G

<400> 225
acgcggggag ttccgccatg gcctccttgg aagtcagtcg tagtcctcgc aggtctcggc 60
gggagctgga agtgcgcagt ccacgacaga acaaatattc ggtgctttta cctacctaca 120
acgagcgcga gaacctgccg ctcatcgtgt ggctgctggt gaaaagcttc tccgagagtg 180

gaatcaacta tgaaattata atcatagatg atggaagccc agatggaaca agggatgttg 240
ctgaacagtt ggagaagatc tatgggtcag acagaattct tctaagacca cgagagaaaa 300
agttgggact aggaactgca tatattcatg gaatgaaaca tgccacagga aactacatca 360
ttattatgga tgctgatctc tcacaccatc caaaatttat tcctgaattt attagcccgt 420
ggggccaatt ttttaactca natcttgctg agaccaggag catctgattt aacaggaagt 480
ttcagattat acccgaaaaa gaagttctag agaaattaat agaaaaatgt ggttctaaag 540
gctacgtctt ncaaatggag atgattggtc nggcaagaca gttgaatatt ctattggcga 600
ggttccatat canttgngg 619

<210> 226
<211> 277
<212> DNA
<213> Homo sapiens

<400> 226
acgcggggcc cctcatttac ataaatatta tactagcatt taccatctca cttctaggaa 60
tactagtata tcgctcacac ctcatatcct ccctactatg cctagaagga ataatactat 120
cgctgttcat tatagctact ctcataaccc tcaacaccca ctccctctta gccaatattg 180
tgcctattgc catactagtc tttgccgcct gcgaagcagc gggggcccta gccctactag 240
tctcaatctc caacacatat ggcctagact acgtacc 277

<210> 227
<211> 328
<212> DNA
<213> Homo sapiens

<400> 227
ggtacatatt tttgccaatg ctatacagca aaaatgaaaa acttacagaa aggtaaacaa 60
aattgagtcc actttttaa tttcacaagc tgctttaaac tatagaacca ccagatatct 120
gtaaaataag caaaactggt aagtgtgttt ttttaattga gggaaggagg gccagaggag 180
ttggtgcaga agcgcttcgg gtgaattcat accagagcca ccgggtgtga ctcggctacc 240
tctcccaatt accacaggga ggtcttaaaa ttgaatttca gtttcagcag atactccaga 300
tttacctgag caatatcata gacaatgt 328

<210> 228
<211> 609
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(609)
<223> n = A,T,C or G

<400> 228
acgcgggagt tcaagcagat gtatggctaa ccggaaacag gtgggtcacc tcctgcaaga 60
agtggggcct cgagctgtca gtcatcatgg tgctatcctc tgaacccctc agctgccact 120
gcaacagtgg gcttaagggt gtctgagcag gagaggaaag ataagctctt cgtggtgccc 180
acgatgctca ggtttggtaa cccgggagtg ttcccaggtg gccttagaaa gcaaagcttg 240
taactggcaa gggatgatgt cagattcagc ccaaggttcc tcctctccta ccaagcagga 300
ggccaggaac ttctttggac ttggaaggtg tgcggggact ggccgaggcc cctgcaccct 360
gcgcatcagg actgcttcat cgtcttggct gagaaaggga aaagacacac aagtcgcgtg 420
ggttggagaa gccagancca ttccacctcc cttccccaac atctctcana gatgtgaaac 480

cagatctcat ggcaacnaag ccctntgcaa gaagctcaag gaanctaagg aaaatggacg 540
ttttcagana atggttgtag ttcatgggtt ttncctactg ccgggtcctt tcttangacc 600
cgcanaant 609

<210> 229
<211> 610
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(610)
<223> n = A,T,C or G

<400> 229
ggtacttttt tttttttttt tttttttttt gcagactaaa aattttattg ctctttaaag 60
ccttaggccg tatgacaaaa tgaagagact gaaatgacag cggggaggaa gaaacagaag 120
aaagataaga atgaggtggt caggttgggg gaattaagcg aatattctct tccagggtga 180
gtcctcacac tggtctcatg cccatgatga gttgcacacc aaacacaggc tgctgacttc 240
cctcctgcac tagtcagtga acttgcagac atagggtaac ctcacattac agttataatc 300
tttccacctc agaaatgctg tgcttctcga caggctcgca cagtggccgg ggcttganat 360
ggtggaggga tttctctccc atgcaaagta attcatcaca tcactgntac tccactccca 420
accttctcca ttgggctcgg tgccctgtgt ggggtcatgg acccaatcca acgtatgant 480
actggtacca atgctnttac cagggaggac acnaaaggat cccttacccc ctgagcacag 540
acccnaggtt tcaaanggcc gttttggcag gccaaactgn atntgnccag aatttggnga 600
caaaacaagg 610

<210> 230
<211> 346
<212> DNA
<213> Homo sapiens

<400> 230
ggtcggccga ggtaccatgc actgagtgac tgtggggatc atgttgttat aatgaacaca 60
agacacattg cattttctgg aaacaaatgg gaacaaaaag tatactcttc gcatactggc 120
tacccaggtg gatttagaca agtaacagct gctcagcttc acctgaggga tccagtggca 180
attgtaaaac tagctattta tggcatgctg ccaaaaaacc ttcacagaag aacaatgatg 240
gaaaggttgc atctttttcc agatgagtat attccagaag atattcttaa gaatttagta 300
gaggagcttc ctcaaccacg aaaaatacct aaacgtctag atgagt 346

<210> 231
<211> 601
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(601)
<223> n = A,T,C or G

<400> 231
ggtacgcggg gagagcacat ccggtgttag aagcgctggt aggccttgga gaggcgggtt 60
aggaagagtg gagactgctg cacggactct ggaaccatga acatatttga tcgaaagatc 120

aactttgatg cgcttttaaa attttctcat ataaccccgt caacgcagca gcacctgaag 180
aaggtctatg caagttttgc cctttgtatg tttgtggcgg ctgcaggggc ctatgtccat 240
atggtcactc atttcattca ggctggcctg ctgtctgcct tgggctccct gatattgatg 300
atttggctga tggcaacacc tcatagccat gaaactgaac agaaaagact gggacttctt 360
gctggatttg cattccttac aggagttggc ctgggccctg cctggagttt tgnattgctg 420
tcaaccccac atccttccac tgctttcatg ggcccgcaat gatctttacc tgcttaacct 480
taatgcactc tatccaagcg ccgtactcct tttctgggag gatcttgatg tcagcctgaa 540
cttgtgcttt gcttcctggg gaatgtttct ttggatccat tggcttttca gcnaactttt 600
t 601

<210> 232
<211> 390
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(390)
<223> n = A,T,C or G

<400> 232
actttttttt tttttttttt tttttttttt ttggttttaa tgtttatttc cccaagacag 60
cctagcctgc actctacttg gataaatttt acaagctagt tttctgctgc ttctagtttt 120
aaactttaac catgtttctg atgacaagga atgctgcaaa aatactctag ttcaacaaag 180
agttatgatc acaaaataat ttttatccat tctacagtgt ttcanaatta ccagttgatt 240
tttaaacaca aagtagatat agatgctaat ggtggctaat ctggtatgtt tcttatagca 300
aactgttgtt catgcaacac ttgtgctcaa aggggaaggc acaggatttc ctacaatgag 360
ccaccttata aagagttctt tttgnacctn 390

<210> 233
<211> 603
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(603)
<223> n = A,T,C or G

<400> 233
cgaggtacgc gggggaagag tgagggttcc aacttttctg cttatctggg aggtgttggg 60
cgcggacaat cgagatgtca gagaaaaagc agccggtaga cttaggtctg ttagaggaag 120
acgacgagtt tgaagagttc cctgccgaag actgggctgg cttagatgaa gatgaagatg 180
cacatgtctg ggaggataat tgggatgatg acaatgtaga ggatgacttc tctaatcagt 240
tacgagctga actagagaaa catggttata agatggagac ttcatagcat ccagaagaag 300
tgttgaagta acctaaactt gacctgctta atacattcta gggcagagaa cccaggatgg 360
gacactaaaa aaatgtgttt atttcattat ctgcttggat ttatttgtgt ttttgtaaca 420
caaaaaataa atggtttgat ataagaaaaa annnnnnnna aaaaaaaagt nctggccngg 480
cggccgttca aanggccaat tccacccact ggcggccgta ctaanggacc aacttggncc 540
aacttgggga atcanggcaa actggttcct ggngaaatgg nttcccttcc aattccccaa 600
atn 603

<210> 234

<211> 616
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(616)
<223> n = A,T,C or G

<400> 234
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cgaggtacct tcattgcgat caaaccagat ggggtccagc ggggtcttgt gggagagatt     60
atcaagcgtt ttgagcagaa aggattccgc cttgttggtc tgaaattcat gcaagcttcc    120
gaagatcttc tcaaggaaca ctacgttgac ctgaaggacc gtccattctt tgccggcctg    180
gtgaaataca tgcactcagg gccggtagtt gccatggtct gggaggggct gaatgtggtg    240
aagacgggcc gagtcatgct cggggagacc aaccctgcag actccaagcc tgggaccatc    300
cgtggagact tctgcataca agttggcagg aacattatac atggcagtga ttctgtggag    360
agtgcagaga aggagatcgg cttgtggttt caccctgagg aactggtaga ttacacgaac    420
tgtgctcana actggatcta tgaatgacag gaaggcagac ccattgnttt tcacatncat    480
ttcccttcnt tccattgggc aaaggaccag ctttnggaaa tctantnttt accnggacct    540
tattcttaat ttgganggaa actnttggac tttgangtnt tcctntacct ngcccgggng    600
gccgtttaaa agggna                                                    616
```

<210> 235
<211> 607
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(607)
<223> n = A,T,C or G

<400> 235
```
acgcggggag tgcgttactt acctcgactc ttagcttgtc ggggacggta accgggaccc     60
ggtgtctgct cctgtcgcct tcgcctccta atccctagcc actatgcgtg agtgcatctc    120
catccacgtt ggccaggctg gtgtccagat tggcaatgcc tgctgggagc tctactgcct    180
ggaacacggc atccagcccg atggccagat gccaagtgac aagaccattg gggaggaga     240
tgactccttc aacacccttct tcagtgagac gggcgctggc aagcacgtgc cccgggctgt    300
gtttgtagac ttggaaccca cagtcattga tgaagttcgc actggcacct accgccagct    360
cttcaccctg agcagctcat cacaggcaag gaagatgctg ccaataacta tgcccgangg    420
cactacacca ttggcaagga gatcattgac cttgngttgg acccaattcc aaacctggct    480
gaccatgcac cgggctttan ggnttnttgg gttttcccaa antttggggg ggaactgggt    540
ttgggttaac ttcctgntna tggnacgntt ttaaatgaat ntgggaaaaa tccaactggn    600
gntttcc                                                              607
```

<210> 236
<211> 608
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(608)

<223> n = A,T,C or G

<400> 236
acgcgggcat gcaacaccac acccagcctg aaacccagat ttttaatatg aaatcaaagt 60
cttcagacct tgtaggtgtc ataaaaagca cgctgaggac cactagtttg caactgccaa 120
tctaaaatat catagacatt atatcacttc aaccacgaaa aaaaagtatg tgaggcagaa 180
aatggaagca accatgccta atttattgtt gaatactttt tccgtatacc aagagcttcc 240
tttgcactag catctgaaac tatatccaga atgacactgg ttttcataaa agtgttgatc 300
ctcacacctc tttatagtct tgcacctagc acagtggagt gaaacacttt aaatagcact 360
tgntccttga gtatatatgg aaaaaagtga agtattgata aagtgctcaa ctaatatgag 420
cagcatctca ggagtctcca attcttgaat taccagggag tatttttacc attttcccca 480
ntgnaaggcc ttttttgaga nacttaccct caaatngaan gnnttaagca tgntcctttt 540
tttttccttt tttttttgan aaaagggctt gctntgtggc caggttggan tgcctacntg 600
aaaattcn 608

<210> 237
<211> 609
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(609)
<223> n = A,T,C or G

<400> 237
actatttcat atattgtgtg agccccacaa atgtctattt taaaaagagt atagtccctg 60
gccaggcgcg gtggctcacg cctgtaatcc cagcagtttg ggaggccgag gtgggcggat 120
cacctgaggt ctggagttcg agaccagcct gaccaatatg gtgaaacccc gtttctacta 180
aaaatacaaa attagctggg catggtggag catgcctgta atcccagcta ctcgggaggc 240
tgaggcagga gaatcacttg aacccgggag gcgaaggctg cagtgagcca agatcacgcc 300
attgcactcc agcctgagca acaagaggga cactccgtcc ccaaaaaaaa aataataaaa 360
aaaataaaaa ataaaaataa aaagagtata gttcccaatg ggttctacaa acattcctga 420
tttatactgg gggaagtgat gcctaantgg gaacattaat cattatggtt tcgaaaatta 480
aatatttctg caaacaattc ctttgcaaat gctaacttgc catgagctta ccccatttga 540
aattgngnct ttacaaagac cttggccgga ccccttangg ngaattcagn cactggnggg 600
cgttctttg 609

<210> 238
<211> 616
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(616)
<223> n = A,T,C or G

<400> 238
acgaggcggt gcgggaagtc ctgcacggga accagcgcaa gcgccgcaag ttcctggaga 60
cggtggagtt gcagatcagc ttgaagaact atgatcccca gaaggacaag cgcttctcgg 120
gcaccgtcag gcttaagtcc actccccgcc ctaagttctc tgtgtgtgtc ctgggggacc 180
agcagcactg tgacgaggct aaggccgtgg atatccccca catggacatc gaggcgctga 240

```
aaaaactcaa caagaataaa aaactggtca agaagctggc caagaagtat gatgcgtttt     300
tggcctcaga gtctctgatc aagcagattc cacgaatcct cggcccaggt ttaaataagg     360
caggaaaagt tcccttcctg ctcacacaca acgaaaacat ggtggccaaa agtggatgag     420
gtgaagtcca caatcaagtt ccaatgaaga aggggtatgt ctggcttgta acttgttggt     480
cacgtgaaga tgacngacga tgacttgngt ataacattna nctgggctgg caacttcttg     540
gggcaatgnt caanaaaact ggcaaaatgt ccgggccttt tttttagagc cccttggnaa     600
accccangcc ntttta                                                     616

      <210> 239
      <211> 607
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(607)
      <223> n = A,T,C or G

      <400> 239
acagtctgtt cgagaacacc ttggtcatga aagtgacaac ctgctgtttg ttcagatcac      60
aggcaaaaaa ccaaactttg aagtgggttc ttctaggcag cttaagcttt ccatcaccaa     120
gaagtcttct ccttcagtga aacctgctgt ggaccctgct gctgccaagc tgtggaccct     180
ctcagccaac gatatggagg acgacagcat ggatctcatt gactcagatg agctgctgga     240
tccagaagat ttgaagaagc cagatccagc ttccctgcgg gctgcttctt gtggggaaag     300
ggaaaaagag gaaggcctgt aagaactgca cctgtggcct tgccgaagaa ctggaaaaag     360
agaagtcaag ggaacagatg aacttccaac ccaagtcaac ttgtggaaac tgctcctggg     420
cgatgccttt cgttgtgcca ctggccctac cttgggatgc cagcntnaaa ctggggaaaa     480
gngcttctaa tgatancatc tttattgaag cctaagaagg ttctgaattg ggacccattt     540
gttcttcaac caattctggn cttaaatcca ccttgggggt cttccacctc cttggatttg     600
ncacctt                                                               607

      <210> 240
      <211> 615
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(615)
      <223> n = A,T,C or G

      <400> 240
ggtacgcggg gcttttcaca agatggcgcc gaaagcgaag aaggaagctc ctgcccctcc      60
taaagctgaa gccaaagcga aggctttaaa ggccaagaag gcagtgttga aaggtgtcca     120
cagccacaaa aagaagaaga tccgcacgtc acccaccttc cggcggccga agacactgcg     180
actccggaga cagcccaaat atcctcggaa gagcgctccc aggagaaaca agcttgacca     240
ctatgctatc atcaagtttc cgctgaccac tgagtctgcc atgaagaaga tagaagacaa     300
caacacactt gtgttcattg tggatgttaa agccaacaag caccagatta aacaggctgt     360
gaagaactgt atgacattga tgtggccaag gtcaacaccc tgattcggcc tgatggagag     420
aagaaggcat atgttcgact ggctcctgat tacnatgctt tggatgttgc caccaaaatt     480
gggatcattt aactgagtcc acttgctaaa tctgaatata tatatatata tatatctttt     540
cnccccaaaa aaaaaaaaaa aaaaaagtnc tncccggcgg ccgtttaaag gggaattccc     600
cacttggggg cgttt                                                      615
```

<210> 241
<211> 365
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(365)
<223> n = A,T,C or G

<400> 241
acggggggggt cgctttgctg ttcgtgatat gagacagaca gttgcggtgg gtgtcatcaa 60
agcagtggac aagaaggctg ctggagctgg caaggtcacc aagtctgccc agaaagctca 120
gaaggctaaa tgaatattat ccctaatacc tgccaccccca ctcttaatca gtggtggaag 180
aacggtctca gaactgtttg tttcaattgg ccatttaagt ttagtagtaa aagactggtt 240
aatgataaca atgcatcgta aaaccttcag aaggaaagga gaatgttttg tggaccactt 300
tggttttctt ttttgcgtgt ggcaagtttt aaagttatta agtttttaaa atcaagtacc 360
tnggn 365

<210> 242
<211> 625
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(625)
<223> n = A,T,C or G

<400> 242
natngganng nttttccctt aacgtgggcc ncggccgagg nacttttttt tttttttttt 60
tttttttttt gcaggcagct atttaattan gntcttaana catttanaac nccaatttgn 120
gaanataaat tccattcgtc anaacaaacn cagatcgcan gtagccctgg anctgangaa 180
taactttgat ttttggnaaa atttgngagt ccncagcttt ctgatcaatc ttgcgctgct 240
cccnaatctc atatttctct ttttctgggg ccaaaatctt accttcctgg ngtctgggct 300
ttcgcaactt cttcttcttg aaagaagcct cagtaaaaat ggtttgggaa ttttacatta 360
ctgatatcca atttnggtga aatggcaatg accaatttct ngggggggtct tcgtaaaaga 420
actccantga nggnccaaag gtccagtccc aagtataggc nctnaccact gnttcaggaa 480
accacctttt gncctggggg gtccatgagg atgaccaaat ggncccgggg naagctggct 540
ccanttttttt acggcctacc gaagggtttt tgccngggta aaagtttag ggccattttc 600
ngggnaaatc taggcttttg gaaat 625

<210> 243
<211> 639
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(639)
<223> n = A,T,C or G

<400> 243
nncnaattcc nccntaaccn ggncccccgnc caagnacccc ggcncctttg gatgtatnga 60
aatnaacnta ttaatgggga cntattggag aaggaaatnc ctagacctac aactttnagc 120
naatagcngt gatgttttag gaactgaaat gtcacactta aagtcttnag cccagctact 180
tccctatttt tgtggggaga aaanggccng attagaactg ttctggttgt gtttggcggg 240
aggggaataa tttttgttca gtccttctta gtgaccaaac tttaattttt aagaataata 300
tattgactta ctgaactgaa gcattctgag ttgaaaggag ctccncagga ntggagttct 360
gtgttgctca catgttnaaa ncttgctcac cttnatagcn caaggaatac ctatcttcca 420
natnccgcca ttttcatctc ttaaatgnag tccaaagtat gacttgagaa agttgctctn 480
ggattctggg gtcttaaaac tngggattct gggattntgg ggtccnaaag ttnaccttgn 540
aaagttgcct gggnttttan aaatncnctg nattctgggg ttttaaaaaa ttttgaaaaa 600
accccncccn ncttgaaagg gaccttaaaa attaacctn 639

<210> 244
<211> 614
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(614)
<223> n = A,T,C or G

<400> 244
tcgagccgnc ggcccgggcc aggtactttt tttttttttt tttttttttt gaaaatggag 60
tcttgctctg ntgccaaact ggantgcaat ggtgcganct gggctcactg naatctccac 120
ctnccgggtt caagcgattc tcctgcctca cctccgagta actgggacta caggtgcgcg 180
ccaccaagcc cagctcattt ttgnattttt agtanaaatg gggtttcacg atgttggcta 240
ngatggnctc gatctctggt caaagtcttt tctgnaaata tccttggtaa aaaaacaatt 300
ttagactgta gctgttgcaa atgctttaag gaagaaacna aacaactgca gtcttcctga 360
aatgaaaaaa ctcccccaggg ctgctattna aaacaacccc accagcactt caatcatgat 420
gccnacagtg gcccactgaa aaancnggaa aagttcnaat cccaaactgg gatgctcttg 480
actntggaat tntgngggcn ntncccnant ttnanacaaa acngnctngg nccctntttt 540
ttgggggaat ttgggaanaa aaaaacttgn gngttcttgn ggttccnttg ttccccaaaa 600
nactgggggn nggg 614

<210> 245
<211> 620
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(620)
<223> n = A,T,C or G

<400> 245
gccgtggtcg cgggccgagg tccatttgcc tcccggcctc aagccgattc tcctgcctca 60
gcccctccaag tagctgggga ttacaggcac ctgccaccat gcccggctaa tttttgnaat 120
tttagtagag acagggtttc accatgttgc ccaggctggt ttcgaactcc tgacctcagg 180
tgatccaccc gcctcggcct ccaaagtgct gggattacag gcttgagccc ccgcgcccag 240
ccatcaaaat gctttttatt tctgcatatg ttgaatactt tttacaattt aaaaaaatga 300
tctgntttga aggcaaaatt gcaaatcttg aaattaagaa ggcaaaaatg taaaggagtc 360

aaaactataa atcaagtatt tgggaaagtg aagactggaa gctaatttgc attaaattca 420
caaactttta tactctttct ggatatacat tttttttctt taaaaaacaa ctttngatca 480
gaatagcccc atttagaacc ttttggtatc agncaatatt tttaaatagt tnaaccnggc 540
ctaagctnaa agnggcttga tntgagtaaa cttttcaact ggcttgaacc ctnaaccttt 600
taaaatgacc ttccgagntt 620

<210> 246
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 246
acttattctt caggggttac tgagtcggca cctatgacag ctaagagagc tttcttaaag 60
actgcctcag tgtcttcttg gcttttggca ccttcactcc actctgccca ggaaatccac 120
aatggcagac aaacctgggg tttcaggtgc acaaagactt cttcaaaaag catggctatg 180
tcagggctct ttgactcgat cagcacctgc agcttcagct gccacattgt cccagagtct 240
ctaaacaatt caagttccag ctactgncac ttccagagct tcctcaggaa gttataacac 300
agcaacgaaa cactcaactg cttgtattgg cattctgaca gaagcttcaa gttcatgtgc 360
cttcctgaat acagtcatgg tctttncaac ctcttcctct aaggacccac tatttgactt 420
cttaataaat ctttccagcc aaaggngatg aacactttca catgggcctt gtggcaaaag 480
cttnatggct ttttatcncg gacagacctt tctcttcggg cgacctcaat ggtttggctt 540
ggtcgtggag ctggtntttg gctnggactc aacttnaatn ttgcttgccc naaac 595

<210> 247
<211> 364
<212> DNA
<213> Homo sapiens

<400> 247
gggtacacta gaaagtcttt tacaaaataa tcatcttaga tcaacagaag accaatcttc 60
aatgtcgtcc tgcaagatgg gttactttaa catctcctcc tgttttctcc aatgttctcc 120
tttagtatgg ctggtaattg ttttggtgat tgccaccccc tcgagatgcc ttgccataag 180
tgctctgttg gccactgtag tctgcatatc cctgtccata tccatagttc ccatagttat 240
acccagtata atcatatccg ccatagccac tatagttttg atcaccacca taggcactat 300
tgtaatttcc atatccttga tcataatagt tattaaatcc ttggttccag ttttggccct 360
gacc 364

<210> 248
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 248

ggtncagata tcttcaaagg aggaagaaga aagggaaacc agatggtgga cctgaatatg 60
nccccttancc aganctaatc aacccactca gccagaatag aagaagctgg aatagattcc 120
ccaacctggt ttgccagttc atcttttgac tctattaaaa tcttcaatag ttggtattct 180
gnaatttcac tctcatgant gcnactgngg cttaactaat attgcaatgn ggcttgaatg 240
taagtagcat cctttgatgc ttctttgaaa cttgnatgaa tttgggtatg aacagattgc 300
ctgctttccc ttaaataaca cttaaaatta tttggaccag tcagcacaac atgcctnggt 360
tgnattaaag cnnggatatg ctggatttta taaaattggc caaattagag aaatntagtc 420
ccatggaaat atatttcttg taaaaaagtg cttgaatctt tttggtcaag ataatgccac 480
tcttaagaat atcttcncac tnttgangga ttaaatatcg gcantggaaa agccttaaaa 540
atggggtcna cttgccttgn gcctaaaccg accctgaaat gggatttccc n 591

<210> 249
<211> 332
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(332)
<223> n = A,T,C or G

<400> 249
actctccgag agggtcgttt tcccgtcccc gagagcaagt ttatttacca aatgttggag 60
taataaagaa aggcagaaca aaatgagctg ggctttggaa gaatggaaag aaagggctgc 120
ctcaagagct cttcagaaaa ttcaagaact tgaaaggaca gcttgacaaa ctgaagaagg 180
aaaagcagca aaggcagttt cagctttgac agtctcgagg cttgcgcttg cagaaacnaa 240
aacagaaagg ttgaaaatga aaaaacccag ggtaccttgg nccgggacca cgcttaaggc 300
gaaattccaa cacacttggc cggccggtac ta 332

<210> 250
<211> 626
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(626)
<223> n = A,T,C or G

<400> 250
ggtactatta gccatggtca accccaccgt gttcttcgac attgccgtcg accggcgaag 60
ccctttggcc cgcgtcttcc tttgaactgg ttgcagacaa gggtcccaaa ganagcagaa 120
aattttcgtg ctctgagcac tggagaaaaa ggatttggtt ataagggttc ctgctttcac 180
agaattattc cagggtttat gtgtcaaggt ggtgacttca cacgccataa tggcactggt 240
ggcaaagtcc atctatgggg aagaaatttg aagatgaaga acttcatcct aaagcatacg 300
ggtcctggca tcttgtccat ggcaaatgct ggacccaaca caaatgggtc ccaatttttc 360
atctgcactg gccaagactg antggttgga tggcaaanca tgtngtgntt ggccaaagtg 420
aaagaaggca tgaatattgt ggaaggccat ggaacgcttt tgggtncnag gaatggcaag 480
aaccnccagg aagaatcacc cnttnttgac tggggacaac tcnaataagt tgacttgggg 540
nttaatntaa ccccccanca attccttttg gaactcagga aacacccttc ancccanttn 600
tttcaanttc caaaannttg ggcctn 626

<210> 251

<211> 603
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(603)
<223> n = A,T,C or G

<400> 251
acttttttttt tttttttttt ttttttttc aacagaagaa cttttngttt ctttattttc 60
aatattngtc ttattaatat ttttcttatt ttataatgca attacaacaa tttaggagac 120
aaaacantat aaacaaaaga atgttaaata gtttttttta aaaaatagct tgttgcttgc 180
aagaaagtcc atataatctt attccccccc aaatataatt ttatactttg cactaaacca 240
aaatagctta tggaaaatta ggtattaaat agctaaacac agaaaaccta cagctataaa 300
taacataaaa tacagtttaa ctttaatgng atgcttaaac aaagcaaact atgatgcant 360
atgaatcaac ttcattaatt ggacaagtcc agtgaggcnc aaattagata agcnctaaac 420
cctcatgatg ggcaagtgaa accttcaccc cagcaagggt ctttcnggtc ttggctatgc 480
caattccttc canaaaagnc ccagttttac angtctggct ttttccgggg gaacccccca 540
tttntttnnc ccaagttggt tnggatttgg cccccannaa atttttttg gngnaaaaan 600
aan 603

<210> 252
<211> 500
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(500)
<223> n = A,T,C or G

<400> 252
actttatttg ttttttttgt tttgttttgg tttttttttt ggcttgactc aggatttaaa 60
aactggaacg gtgaaggtga cagcagtcgg ttggagcgag catcccccaa agttcacaat 120
gtggccgagg actttgattg cacattgttg tttttttaat agtcattcca aatatgagat 180
gcattgttac aggaagtccc ttgccatcct aaaagccacc ccacttctct ctaaggagaa 240
tggcccagtc ctctcccaag tccacacagg ggaggtgata gcattgcttt cgtgtaaatt 300
atgtaatgca aaattttttt aatcttcgcc ttaatacttt tttattttgt tttattttga 360
atgatgagcc ttcgtgcccc cccttccccc tttttgtcc cccaacttga gatgtatgaa 420
ngcttttggt ctccctggga agtgggtgga ngcagccagg gcttacctgt accttggccg 480
cgaacaccta aggccaantt 500

<210> 253
<211> 634
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(634)
<223> n = A,T,C or G

<400> 253
tcgagcggcc ngcccgggca ggtactatta gccatggtca aaccccaccc gtgttcttcg 60
acattgcccg tcgacggcga acccttgggc ccgcgtctcc tttgagctgt ttgcagacaa 120
ggtcccaaag acagcagaaa attttcgtgc tctgagcact ggagagaaag gatttggtta 180
taagggttcc tgctttcaca gaattattcc agggtttatg tgtcaggggt ggtgacttca 240
cacgccataa tggcactggt ggcaagtcca tctatgggga gaaatttgaa gatgagaact 300
tcatcctaaa gcatacgggt cctggcatct tgtccatggc aaatgctgga cccaacacaa 360
atggttccca gtttttcatc tgcactgcca agactgantg gttggatggc aaacatgtgg 420
tgtttggcaa antgaaagaa ngcatgaata ttgtggaagc catgganccc tttnggtcca 480
ggaatggcag aacnnccagg aanacaccct tgntgactgt ggcaactcga ataaattgac 540
ttggggttat cttaaccncc caacattcct ttggacttag gaancanccc ttcanccent 600
tggttcaant tcccaaaaat ttgggctncc tnng 634

<210> 254
<211> 602
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(602)
<223> n = A,T,C or G

<400> 254
nctttttttt tttttttttt tttttaaat taattaatta aaaaataggt ggnctactgg 60
tggtccttaa gctggaantg cagtgggcac aatcatggnt cactgnagtc tnaacctncc 120
aggttcaagt gatcctccta cctcacctcc antagctggg attacaggca tatgcgacca 180
tgcccagcta attttttatt ttttgtaaaa acggggtctc actatgtcgc ccangctggn 240
cttgaactcc tgaactcaag tgacccttcc gnctnacctn caaagtgcta ggcttacagg 300
tgtgaaccac catgcctggc ctaaaaaatt tattttaaaa aagtaattta tctcttacag 360
ttgtggaggc tgagaaatcc aangncaant ggcncatttg gtgaaaacct tnttgctggt 420
ggggactctg tgaaatnccc aantggcnca tgcatnacac antgangggg cttacattcc 480
aacatgctat ctcttttaag ttttaaagta cnggccnaaa tntgaacntg aatgacttna 540
aatccacnca ttccnctttt ggacnaaaaa ccntgggcaa ttgggatctt ggcnttttna 600
aa 602

<210> 255
<211> 614
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(614)
<223> n = A,T,C or G

<400> 255
cgaggtacag gtaagccctg gctgcctcca cccactccca gggagaccaa aagccttcat 60
acatctcaag ttgggggaca aaaaaggggg aagggggggc acgaaggctc atcattcaaa 120
ataaaacaaa ataaaaaagt attaaggcga agattaaaaa aattttgcat tacataattt 180
acacgaaagc aatgctatca cctcccctgt gtggacttgg gagaggactg gaccattctc 240
cttagagaga agtggggtgg cttttaggat ggcaagggac ttcctgtaac aatgcatctc 300
atatttggaa tgactattaa aaaaacaaca atgtgcaatc aaagtcctcg gccacattgt 360

gaactttggg ggatgctcgc tccaacccga ctgctgtcac cttcaccggt ccagttttta 420
aatcctgagt caagccaaaa aaaaaaaacc anaccaaacn nanaaaccaa ttaagccatg 480
ccaatctcat ctggtttctg cncaagtang gttgncaaaa aagggttacc ncactaantc 540
ntagcccсta aaccnttgcg ggggncantg angggccgan tttganactc cggntggtga 600
nccanttggn ggag 614

<210> 256
<211> 308
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(308)
<223> n = A,T,C or G

<400> 256
ncntccagca gtgggtcatt cgncaacgaa agtcntaccg tagaaaagat ggcgtgtttc 60
tttattttga agataatgca ggagtcatag tgaacaataa aggcgagatg aaagggtctg 120
ccattacagg accagtagca agggaatgtg cagacttgtg gccccggatt gcatccaatg 180
ctggcagcat tgcatgattc tccagtatat ttgtaaaaaa taaaaaaaaa ctaaacccaa 240
aaaaaaaaat nnnannnaac annnnanaaa aannnnaaaa aaaaaaagta cctnggccgn 300
gaccacgc 308

<210> 257
<211> 602
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(602)
<223> n = A,T,C or G

<400> 257
gcgtggtcgc nggccgaggt acgcggggga gacaaaccat accatatccc accagagagt 60
cgcagacact atgctgcctc catggccctg cccagtgtat cttggatgct gctttcctgc 120
ctcatgctgc tgtctcaggt tcaaggtgaa gaaccccaga gggaactgcc ctctgcacgg 180
atccgctgtc ccaaaggctc caaggcctat ggctcccact gctatgcctt gtttttgtca 240
ccaaaatcct ggacagatgc agatctggcc tgccagaagc ggccctctgg aaacctggtg 300
tctgtgctca ntggggctga gggatccttc gtgtcctccc tggtgaagag cattggtaac 360
agctactcat acgtctggat tgggctccat gaccccacac agggcaccga acccaatgga 420
aaangntggg antggaataa cantgatgtg atgaattact ttgcatggga gagaaatcct 480
tcancatttt naaccccggc cctgtccaac ctntcaaaaa cncacatttt taaggggaaa 540
atttactgg atggganggt acccttttnt ggaagtactg cttttcngga nggaagtacc 600
cc 602

<210> 258
<211> 600
<212> DNA
<213> Homo sapiens

<220>

<221> misc_feature
<222> (1)...(600)
<223> n = A,T,C or G

<400> 258
ggtgtntgng ncttatntgt agcggcgcgg ntggttctga aatcgccttc agcggcgccg 60
cagtcntatt atgtgnatgt ccctaccacn aaaatncaga ttaattggna tgctcattac 120
ccacgtgaac gccaaagccc ttcgaagtag tgctgccctg cactnaatca agaagttgca 180
ttaaaattag aaccaaatcc agagtcactg gaactttctt ttaccatgcc ccanattcag 240
gatcagacac ctagtccttc cgatggaaag cactagacaa agttcacctg agcctaatag 300
tcccagtgaa tattggtttt atggggatag gtgatatggn caatgaattc aagttggaat 360
tggnagaaaa actttttgct naagacncng aagcnaagaa cccattttct actnaaggca 420
cagatttaga cttggagatg gtagcttcct atatccaatg gatgatgctt tcagtccgtn 480
cnttgatcag tgncacnttn gaaagcagtt cccaagncct gnaacccagt cctaagccaa 540
gtccggttcn gcgattaatc cgactatgta tgcccttcat ngcccctgtn ataaacnggn 600

<210> 259
<211> 600
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(600)
<223> n = A,T,C or G

<400> 259
gccgaggtac atgggaaagg gagtatggng agctatttcc tttttaaagg atgaagacct 60
tcataaattg gcccctcgga ttctggtgat tcccgcccgc aagcgcaaat gctccagtgn 120
gttatgaaaa tgnttgntaa tctgctctgg ttcttcactg gattcaagan tcgggaggnc 180
ttctcgaatc ttttggataa nctggtttaa aacctgaatt gntacccgca tcattttcct 240
tttcataaaa atagatatat ctgntcagaa tttctatnaa aagctgcact tgtaganang 300
ggtccatgca ctgatttgct atttttaaag cttttttttan gcactccatt accctnttgc 360
cttcgtgaaa cttcttccca tttttgnccn ggttctggcn gaccngaaga aatgtgccca 420
agtgcttaca agttnggcct gacaaggttc nttaaaantt tggatgtacc aagggccccc 480
tgggtcctca aaggtcatga atctttttac tggaaccctt atcctttnaa aaggccatgg 540
tcaagggaat gnncttcttg gctttgaaac ccggattaan tttttncaaa aaaagccngn 600

<210> 260
<211> 593
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(593)
<223> n = A,T,C or G

<400> 260
acgcgggaac tccatcctca ccacccacac caccctggag cactctgatt gtgccttcat 60
ggtagacaat gaggccatct atgacatctg tcgtagaaac ctcgatatcg agcgcccaac 120
ctacactaac cttaaccgcc ttattagcca gattgtgtcc tccatcactg cttccctgag 180
atttgatgga gccctgaatg ttgacctgac agaattccag accaacctgg tgccctaccc 240

```
ccgcatccac ttcctctggc cacatatgcc cctgtcatct ctgctgagaa agcctaccat      300
gaacagctta ctgtagcaga gatcaccaat gcttgctttg agccagccaa ccagatggtg      360
aaatgtgacc ctcgccatgg taaatacatg gcttgctgcc tggtataccg tggtgacntg      420
ggtnccaaag atgtcaatgc tgccttggca ccattcaaac caagcgcaga ttcaatttgg      480
ggatggtgcc cactggcttt aaggtngnat naactaccag cttccactgn ggnnctggtg      540
gaaactngcc aaggnncctt ggccggaaca ccctangggg aattcanncc act             593
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<210> 261
<211> 343
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(343)
<223> n = A,T,C or G

<400> 261

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cctacctctc ttnccactgc aaatttctgg gatagaccaa aagtgaattt gattatgtgt       60
tggctgaagt tcttcattct gactgttgan gggaggtttt cctttgaaga gttttcatcc      120
cagactcagc tgtcttttca catggatgaa ataattcctg ctaccaacaa cagagcttca      180
ccaggaagtt gagttttcaa gatgccttgt tgctttgaag aagggagtga tgtcaattct      240
cttgntacat tctcccttta gcaacctgag taagagactc tctgccactg ggctgcaaaa      300
aaataaatta cttgaatctc cccttggccc angctgaggt acc                        343
```

<210> 262
<211> 593
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(593)
<223> n = A,T,C or G

<400> 262

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actttttttt tttttttttt ttttttttgtt tttttttttt tttttttttt tttttttttt      60
tttttttttt ttacagngtn ttttcatttt tattactcaa aaaagtttca tttttttnat     120
ttanctttnt gactntgggc ttgggccttn aacantttca naacgatttt ntgctcctcg     180
anaaggaaag cncccttgat cctgncacna acncntttag cncacatgga accnccatag     240
gccctgntga catgtttctt tgtttnggac aatntcataa aaactttagg nnttacagca     300
cnaacccctn naagtntgcc tgggcncaca ccanatgcaa attttggggc tttcccaacc     360
ttnttggnat aaaggtaaac aattttatta ccagggggtt cgggacaacc tanttttgtt     420
aaaggctgta ttgtaggaaa acctacctcg ggatgtcaaa cccttnacca ttttgagggn     480
ctggaaanaa ngttcccgga aanccccggg tancttnggc cggaaccccc taangggnga     540
attccnaccn cttgggggcn gtantaaggg ganccaantt gggccaaant tgg            593
```

<210> 263
<211> 591
<212> DNA
<213> Homo sapiens

<220>

<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 263
accaagagtt tgctcctggc tgctttgatg tcagtgctgc tactccacct ctgcggcgaa 60
tcagaagtaa gcaactttga ctgccgtctt ggatacacag accgtattct tcatcctaaa 120
tttattgtgg gcttcacacg gcagctggcc aatgaaggct gtgacatcaa tgctatcatc 180
tttcacaaag aaaaagttgt ctgtgtgcgc aaatccaaaa cagacttggg tgaaatatat 240
tgtgcgtctc ctcagtaaaa aagtcaagaa catgtaaaaa ctgtggcttt tctggaatgg 300
aattggacat agcccaagaa cagaaagaac cttgctgggg ttggaggttt cacttgcaca 360
tcatggaggg tttaatgctt atctaatttg tgcctcactg gacttgncaa ttaatgaagt 420
gatcatattg catcataagt ttgctttggt taancttaca ttaaagttaa ctggatttta 480
agggaattat actgtaggtt ctggggtaac tatttaatac taattttcat aacnatttg 540
gttaatncca agttnaaatt tatttggggg gaanaaaatt tttggccttc t 591

<210> 264
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 264
accaagagtt tgctcctggc tgctttgatg tcagtgctgc tactccacct ctgcggcgaa 60
tcagaagtaa gcaactttga ctgccgtctt ggatacacag accgtattct tcatcctaaa 120
tttattgtgg gcttcacacg gcagctggcc aatgaaggct gtgacatcaa tgctatcatc 180
tttcacaaag aaaaagttgt ctgtgtgcgc aaatccaaaa cagacttggg tgaaatatat 240
tgtgcgtctc ctcagtaaaa aagtcaagaa catgtaaaaa ctgtggcttt tctggaatgg 300
aattggacat agcccaagaa cagaaagaac cttgctgggg ttggaggttt cacttgcaca 360
tcatggaggg gtttagtgct tatctaattt gtgcctcact ggacttgtcc aattaatgaa 420
gttgattcat attgcatcat agtttgcttt ggttaagcat cacattaaag ttaaactgga 480
ttttatggta tttatagctg nanggtttct ggggttanct atttaatact aaatttccat 540
aagcttttttg ggttaangcc aagnttaaaa ttttttttggg ggggaaaaaa atttt 595

<210> 265
<211> 592
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(592)
<223> n = A,T,C or G

<400> 265
ggtacttttt tttttttttt tttttttttt ttgaaaatta tacttttatt tgagtcacca 60
ggagaaagat tcacttgtgg ttcaagtcaa atgttcanaa tcataacagg ccanaaaggt 120
ttgatcccga gcacaagccc acgagggagg ggaccaaaac agaccaaaat gagacaacaa 180
ccccatataa aaagatgaac tggcggcttc acacactcac acacatacac atacacacgg 240

atgaaatgtt tggacagagg caaatttcac gtggtcattt ctgtttcttt ttaaatacag 300
gtttgtgggg tggtattttg tttttccag ctataaaaaa aggcccaaaa gtgcatgtgt 360
gagggggaa aggcagaaat taagcaataa agtcattttc cctggaggga catganaggg 420
agaaaacagg aggcaattgc tggganaacg cactttctta acactgggct tttgggtatt 480
cttantattg gnccncaaaa agttattttc acattctaac tttgaagnct ntttccnggg 540
attnaatggn ccttaaaacc tttgggaact ttaaaaaaac cngggcttac cc 592

<210> 266
<211> 594
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(594)
<223> n = A,T,C or G

<400> 266
acgcggggaa aaaaaaggca gtattccctt tttaaatgag ctttcaggaa gttgctgaga 60
aatggggtgg aatagggaac tgtaatggcc actgaagcac gtgagagacc ctcgcaaaat 120
gatgtgaaag gaccagtttc ttgaagtcca gtgtttccac ggctggatac ctgtgtgtct 180
ccataaaagt cctgtcacca aggacgttaa aggcatttta ttccagcgtc ttctagagag 240
cttagtgtat acagatgagg gtgtcccgct gctgctttcc ttcggaatcc agtgcttcca 300
cagagattag cctgtagctt atatttgaca ttcttcactg tctgttgttt acctaccgta 360
gctttttacc gttcacttcc ccttccaact atgtcccaga tgtgcaggct cctcctctct 420
ggactttctn caaaggcact tgacccttcg gnctctactt ggcccctnac ctcacccccct 480
tctggcaccg gncntgngac attcacttcn gagaagaccn cccccaagga ggcnggcgnt 540
tggnccanga aaaaaccccg gggaagggtt tntttttttn aaagggaaat ttcc 594

<210> 267
<211> 598
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(598)
<223> n = A,T,C or G

<400> 267
actggccctc ggtgctggca aaggtgtagt tccactggcc gagggaatca agacatagtg 60
gtccttctgc taagccaagg gctgccacaa tgacacagta gccagatcct gcaattccaa 120
tgagagcagc caatacagaa gaaagcatcg cacatcgttt gccacagttt tcatggccac 180
agcagccaca gcagtcatcc tgttccagcc caatgaagac aaatgctggc aggagcatca 240
gcagggccac ctcctacgat gccagaaaag aaccacacga aacggctgag gtggttttcg 300
gaggcatact ttgttcccat tgggaaagta aagccaaata ttacccgcga tgcacaggaa 360
ggggcgagcc caaccagaaa atgtccgaat gcatcgtgca cacttcccat agcacatggt 420
ggtcttgcta ggtttttctc ccccttctct ttggncttca acttcagtga taccccaaat 480
tagatgaaag tggtgccctt ttgggtggaa aaagcaaaca ccaaccccgg gtacctttgg 540
gccggaacac ncttaaggcc aattccannc aattggcggc ccgtacttan gggatccc 598

<210> 268
<211> 590

<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(590)
<223> n = A,T,C or G

<400> 268
ggacatatta tcaataggct ataagatgta acaacgaaat gatgacatct ggagaagaaa 60
catcttttcc ttataaaaat gtgttttcaa gctgttgttt taagaagcaa aagatagttc 120
tgcaaattca aagatacagt atcccttcaa aacaaatagg agttcaggga agagaaacat 180
ccttcaaagg acagtgttgt tttgaccggg agatctagag agtgctcaga attagggcct 240
ggcatttgga atcacaggat ttatcatcac agaaacaact gttttaagat tagttccatc 300
actctcatcc tgtattttta taagaaacac aagagtgcat accagaattg aatataccat 360
atgggattgg agaaagacaa atgtggaaga aatcatagag ctggagacta cttttgtgct 420
ttacaaaact gtgaaggatt gtggtcacct ggaacaggtc tncaatctat gtagcactat 480
gtggctcanc cttggtaccc cttggattat atatcaacct gnaacatgng nctgggactt 540
actttcnaaa cnaaatnttc cttntttgaa gaaaatctgg gtttttgnaa 590

<210> 269
<211> 602
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(602)
<223> n = A,T,C or G

<400> 269
acttgaagga agtcgaatca gagatagact ctgaagaaga acttataaat aaaaaaagaa 60
tcatagagaa agttattcat cgactcacac actatgatca tgttctaatt gagctcaccc 120
aggctggatt gaaaggctcc acagagggaa gtgagagcta tgaagaagat ccctacttgg 180
tagttaaccc taactacttg ctcgaagatt gagatagtaa aagtaactga ccagagctga 240
ggaactgtgg cacagcacct cgtggcctgg agcctggctg gagctctgct agggacagaa 300
gtgtttctgg aagtgatgct tcaggatttg ttttcagaaa caagaattga gttgatggtc 360
ctatgtgtca cattcatcac aggtttcata ccaacacagg cttcagcact tncntttggt 420
ggtggttcct ggtcccntgg aagttggaac caaattaatg gngtagtctc tatacccaat 480
acctttggtt ttcatgtgta anaaaaaggn ccattacttt taanggattg tgctggnctt 540
attgngccan taactttttt ttaaatggcc cagttacngg ttttaattct taaaannaaa 600
aa 602

<210> 270
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 270
ggtacgcggg ggtaggagcc tctctcccta ctgctgctac acaagaccct gagactgacc 60
tgcaggacga aaccatgaag agcctgatcc ttcttgccat cctggccgcc ttagcggtag 120
taactttgtg ttatgaatca catgaaagca tggaatctta tgaacttaat cccttcatta 180
acaggagaaa tgcaaatacc ttcatatccc ctcagcagag atggagagct aaagtccaag 240
agaggatccg agaacgctct aagcctgtcc acgagctcaa tagggaagcc tgtgatgact 300
acagactttg cgaacgctac gccatggttt atggatacaa tgctgcctat aatcgctact 360
tcaggaagcg ccgagggacc aaatgagact gagggaagaa aaaaaatctc tttntttctg 420
gaggctggca cctgatttg tatccccctg tagcagcatt actgaaatac ataggcttat 480
atacaatgct tctttctgga tattctcttg gcttgggtgg accccttttt ccggccccag 540
aattgttaan taatngaann nccntncann aagggnnnaa aggnaaatca ncttt 595

<210> 271
<211> 592
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(592)
<223> n = A,T,C or G

<400> 271
ggtacattga gatcccgcct ctacaaaatc aaaaaattag ccaggcaagg tggtgcgtgc 60
ctgtcgcccc agctacttgg caggctgagc tcaggaggtc aagcctgcct tgggccatga 120
tcatcccatg cactccagcc tgacattcag agcaagacct tgtctcaaag aaagaaaaac 180
atttttatgg tgttttcttt tttagtcttt tcaataatga aaattttcat tttacaggta 240
aaatgaaagg cctggcattt attcaagatc ctgatggcta ctggattgaa attttgaatc 300
ctaacaaaat ggcaacctta atgtagtgct gtgagaattc tcctttgaga tttcagaaga 360
aaggaaacaa tgtgattcaa gatatttaca taccagaagc atctaggact gatggatcac 420
tgtcccgatt caaattattc ttcagtccat ttccccttc tatttcagct ggtccttttc 480
acctaactgt cagtcattct ggtttcaacn atgctttatc tcatgtcctt gaatatagtt 540
ggggnacttt aatttttang gaataatnna acagnttccn ttaaaggntn ng 592

<210> 272
<211> 607
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(607)
<223> n = A,T,C or G

<400> 272
acattaaagt gtgatacttg gttttgaaaa cattcaaaca gtctctgtgg aaatctgaga 60
gaaattggcg gagagctgcc gtggtgcatt cctcctgtag tgcttcaagc taatgcttca 120
tcctctctaa taacttttga tagacagggg ctagtcgcac agacctctgg gaagccctgg 180
aaaacgctga tgcttgtttg aagatctcaa gcgcagagtc tgcaagttca tcccctcttt 240
cctgaggtct gttggctgga ggctgcagaa cattggtgat gacatggacc acgccatttg 300
tggccatgat gtcaggctcg gcaacaggct ccttggtgac actcaccaca ttgnttttca 360
agctgacttt cagcttgnca ccttggagag actttaaccc ggaccaaggg cccgatgcct 420
tccgttaccc aggaatttca tcaccaatgg tggtanttca ggaatgttgg caagtttcct 480

tggcatnttc ccaaanagtt tgttcccgtt cttnttgggn ggcangggct tcggaaaggg 540
ttnattttgt ngggaaccna aaaactgggg tnaaactcct tnccggttna ngggtttccg 600
nnanccn 607

<210> 273
<211> 398
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(398)
<223> n = A,T,C or G

<400> 273
ggtaccgcca ttattctttt gggcaccttt ggttgttttg ctacctgccg agcttctgca 60
tggatgctaa aactgtatgc aatgtttctg actctcgttt ttttggtcga actggtcgct 120
gccatcgtag gatttgtttt cagacatgag attaagaaca gctttaagaa taattatgag 180
aaggctttga agcagtataa ctctacagga gattatagaa gccatgcagt agacaagatc 240
caaaatacgt tgcattgttg tggtgtcacc gattatagag attggacaga tactaattat 300
tactcagaaa aaggatttcc taagagttgc tgtaaacttg aagattgtac ctgccccggg 360
ccgnccgctc gaaagcttaa ntggccgttt cnaanncg 398

<210> 274
<211> 587
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(587)
<223> n = A,T,C or G

<400> 274
actttttttt tttttttttt tttgttgaat caaaagcagg gtttattttt ctatcaaatc 60
cccaatccat gttccagcca atggatgaag ggtgaatcaa gccccacata gactcttggt 120
aaaaacaatt ctaactttct aaaaaaaaaa aaagccaaca cacttttttc tttcttttca 180
aaaagctccc aggcctttgg gaacagctga aacaaattca tatcctgact aggtctgttt 240
tctcttaggt atttggatgg tccctctctg ctgccacttc tgcacagatg aggcactgat 300
aatggcctgc aggtcactca caatcctagc tccacatcac tccatggttt gataacctag 360
aaccacgtta tgatttccat ttataatgcc ctaagaacag ctgaaaagat ctgtattaaa 420
ttctgcaaat ctttattgag tgccactatt tgctgggcac angctaggcn ctggattctg 480
ctggttcttg agaaacctaa aanggnncct tnggccggaa cacccttang gcgaaatcca 540
cncactgggg ggcgtactaa ngggatccaa ctttggncca acttggg 587

<210> 275
<211> 588
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(588)

<223> n = A,T,C or G

<400> 275
acttttttttt tttttttttt tttgccttta taagagaatt tttattgtta attatttacc 60
ttaatagttt cagaaagagg aacaaattag ctcagtccaa catgattggc agttggcata 120
ttctagtgaa gcaagtgttc tgactgctaa ggatttaatt tggataattt taatacttag 180
ccatctaaca cttcaagcat aacccagaat aaatgcacca ccttcctttc actttaatac 240
ccgnacctac ctcacttcga tataagaaat atcattcaat atgatttcca gaagggacaa 300
gtttcctgga gaatacaggc atganggaca atgcacaaaa agaaaaactc aaaatnaaac 360
tctggatgga taattactaa gctaagggaa ccaaaccttc caatttntaa agaaattaaa 420
tccggttcca aatgcctnat angnctatgt tnaaaaggtt ctggattaat agaaattaaa 480
gnttgnttnt tacaggatnc cccaaccgtt acgggccctt ngcccagaat gggccttaaa 540
anccaaagng tcttttccgn ngaggcccca tttnanaatc cttntttt 588

<210> 276
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 276
actttagata catcattcct caaaaagttt ttaacggaga aagtggggca attcaatggg 60
ggaaaggacg gcctttttaa caaatggtgc tggttctact gggtatctgc atccttgata 120
cacagaagtt aactcaagat ggaccacaga ctcacatgta agagctaaaa taacattctt 180
agaagaaatc atggaagtaa atcttcgtga ccttggatca ggtaatgggt actttttttt 240
tttttttttt tttttttta tcagattaat tttactttat ttcttcaggc ctggggtttt 300
tcgatgactt caaatttggg atcttcaaat ttgaaggtgg gaaatggtat tcatgtctgc 360
attaccaaac atttgctttg acttaaaaag ctcctctcca gctcttgccg atctctgaac 420
tagcatcaac aggntcctcc agatgtctgg nccttaaatt tggattccct aatcttggcc 480
acaaagangt ttcttggata gggaacaaag ttcccttatt naaatgccan tngtngaacc 540
nccaatgttc cttcncaaaa ngggcttaaa ccggttaccc aattgacaaa ggaaa 595

<210> 277
<211> 597
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(597)
<223> n = A,T,C or G

<400> 277
ggtactgttc ctgttggccg agtggagact ggtgttctca aacccggtat ggtggtcacc 60
tttgctccag tcaacgttac aacggaagta aaatctgtcg aaatgcacca tgaagctttg 120
agtgaagctc ttcctgggga caatgtgggc ttcaatgtca agaatgtgtc tgtcaaggat 180
gttcgtcgtg gcaacgttgc tggtgacagc aaaaatgacc caccaatgga agcagctggc 240
ttcactgctc aggtgattat cctgaaccat ccaggccaaa taagcgccgg ctatgcccct 300
gtattggatt gccacacggc tcacattgca tgcaagtttg ctgagctgaa ggaaaagatt 360

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gatcgccgtt ctggtaaaaa gcttggaaga tggccctaaa ttcttgaagt ctggtgatgc     420
tgccattggt tgatatggtt cctggcaagc ccatgtgtgt tgaaagcttc ttaaactatc     480
cacctttggg tcgctttgct ggtccngatt tgagacanac catttccgnn gggtggcaat     540
caaaccattg ggccaanaaa gnttntggac ttgcaagggn nccaaatttt ncccaa         597

<210> 278
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 278
ggtacttttt tttttttttt tttttttttt ttagtttatt aaaatactga gttttatttc      60
acatgtatat ttttgtctcc ccaccatttc catgtctgac caccgctact actatgtcct     120
atcataacat tccatacata cttaaaacca agcaaagggt ggagttccat ctttaaaaac     180
taaacaggca ttttggacaa cacattcttg gcaatagaac ctggacaaca tttatcaaac     240
acggtaggga aagttctcac tctgcattat aaaaaggaca gccagatatc aactgttaca     300
gaaatgaaat aagacggaaa attttttaac aaattgntta aactattttc ttaaagagac     360
ttcctccact gccagagatc ttgaatagcc tcttggncag tcattccgga aacaattctt     420
ccataattga tgaatttggc tttcactttt gggaagagaa cccccttttc tatacttggg     480
tgcattttgc ttaaaggctt ctacaaacta gggcctttgg gggtttaaga gttttccngg     540
gtcttgaagg ntcttggcct ttgaacttgg ggtnaaaang gttgngcttt tccat          595

<210> 279
<211> 586
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(586)
<223> n = A,T,C or G

<400> 279
ggtacgcggg gagatacgtt cgtcagcttg ctcctttctg cccgtggacg ccgccgaaga      60
agcatcgtta aagtctctct tcaccctgcc gtcatgtcta agtcagagtc tcctaaagag     120
cccgaacagc tgaggaagcc cttcattgga gggttgagct ttgaaacaac tgatgagagc     180
ctgaggagcc atttgagca atggggaacg ctcacggact gtgtggtaat gagagatcca     240
aacaccaagc gctccagggg ctttgggttt gtcacatatg ccactgtgga ggaggtggat     300
gcggctatga atgcaaggcc acacaaggtg gatggaagaa ttgtggaacc aaagagagct     360
gtctccagag aagattctca aagaccaggt gcccacttaa ctgtgaaaaa agatatttgg     420
tggtggcatt naagaagacc ttgaagaaca tcacctaaga gattattttg acagtatgga     480
aaattgaatg attgaaatca tgacttgacc aagcatggcc aaaaaagggc tttgctttga     540
accttgagac atgattcngg ataaaatgcn tcnaatncnt ntggga                    586

<210> 280
<211> 612
<212> DNA
<213> Homo sapiens
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<220>
<221> misc_feature
<222> (1)...(612)
<223> n = A,T,C or G

<400> 280
acttttttt ttttttttt tttttcttt ttttttttt ttttttttt ttttgaaaaa 60
gtcatgaagg ccatggggtt ggcttgaaac cagctttggg aggttcgatt ccttcctttt 120
ttgtctaaat tttatgtata cgggttcttc aaatgtgtgg tagggtgggg ggcatccata 180
tagccactcc aggtttatgg agggttcttc tactattagg acttttcgct tnaaaacgaa 240
ggcttntcaa atcatgaaaa ttattaatat tactgctgtt anaaaaatga atgagcctac 300
anatgatagg atgtttcatg gggngtatgc atcggggtaa tccnaataac gtcggggcat 360
tccggatagg cccaaaaang tttntgggaa aaaaagtttn atttaccccc attaaattta 420
tnnnnaaaag ggattttgcc taaggttggg ctaagggggt ancccngaaa attgggggaa 480
atcangnaat gaaacccccct ntgatggnca aaaacagctc ctnttggttg ggccttatng 540
ggaanngggc ttcaacntan naccttnggc ggnaaaaccc ttanggngaa ttnnnnncaa 600
ntggggggg tn 612

<210> 281
<211> 593
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(593)
<223> n = A,T,C or G

<400> 281
acgctgcttc ttcagagcaa tacgccgccg tttgtgctgc aggacacgtg gagtaacaag 60
acgctgaatc ttgggtgctt tggtcctagg tttcttacct tctttattta agggctttct 120
tacaacatac tggcggacat catcttcttt agagagattg aaaagtttgc ggattctgct 180
agctcttttg gggcccaggc ggcgaggcac tgtagtatca gtcagtccag gaatacccctt 240
ctctcctttt tttacaataa ccaagttgag aacgctcaga tttgcatcca caatgcaacc 300
acgaactgat tttctctttc tttctcagtt ctccttggtc tgtaacagga atgcccctta 360
ctcaatanca ggcggacacg ggcatgggtc aagacaccct gcttcatggg gaaaccttgg 420
ttgncgttcc accactggat tcggaccaca taaacctttc attcttnaac caaacgtaac 480
ancaactttt ggnggccata cnctttata naaagtccgg ggganaagtn ttttgcagga 540
caagcctgta acnaatagtn aaatcccgga tttggattcc taancctttt ccn 593

<210> 282
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 282
ggtacaattc aagaaactaa gtatttatgg gcattgaaga aaaaatgttg agataaaatt 60

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gctgtgcaga aaaaagtgtt aatgaagccg acctgactac ttaaccttag agacctgctt     120
tacaaggttg gcccttgatt ggcatctggg aacttggagt tcagggggct tccaccattc     180
ccagaactga tcaaagtagc ttactatatc taaactgtaa aacaatatag tttctcctga     240
acacctgctt tccttctggg agtctggaat tttggtatgt gccaggcaga gactaccttt     300
gtgaccagct cccagtaaaa accccaggca ctcagtctct aacaagcttt tctggttgac     360
agtgtttcac aagtgctggt acaactggtt gctgggagaa ttaagctcat cctctgtgat     420
tccactggcc gaggattctt ggaagcttgc acttaagttt cccctgactt caccccatgg     480
gctttttttcc ttgctgattt ggtttgnatc cttcctgnat aaatcatggc ctgaaccnaa    540
cttgaaaaaa aaannnnnnn nnaaaaaaag gtncttgccc ggcggccgtt naaat          595
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<210> 283
<211> 348
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(348)
<223> n = A,T,C or G

<400> 283

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actttttttt tttttttttt tttttttttt ctattttttt tttttttttgg ctntanaggg     60
ggtanagggg gtgctatagg gtaaatacgg gccctatttc aaagattttt aggggaatta     120
attntaggac gatgggcatg aaactgtggt ttgctccaca natttcanag cattgaccgt     180
agtatacccc cggtcgtgta gcggtgaaag tggtttggtt taaacgtccg ggaattgcat     240
ctgtttttaa gcctaatgtg gggacagctc atgagtgcaa nacgtnttgt gatgtaatta     300
ttatacgaat gggggcttna atcgggagta cctnggccgn naccacnc                  348
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<210> 284
<211> 563
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(563)
<223> n = A,T,C or G

<400> 284

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ggtacccatt aatttgctca gatatagcag gcttaatggt tctatatttt caaaagtttt     60
taagaatggt ttctaacgta ggagagggaa aacatccacc atccctttc agaatttaaa      120
tggagggcag taaacattct ttacacccaa aacctatggc agcagttcaa atttgaccaa     180
ggtaaatgta gaatagagat gttctaaaca cagctaggac tcagcaagtc taacacacta     240
aaatcatatg attacatttt aaaagaaaat gcacaaaaac caaatagaaa ttttgagatt     300
ttttttcatt tgaaggtaat cttaatgcta ttaaattcac aaatgctaat ttaaataccc     360
aatcctattt atctaaaaca cacattgcaa acacacaaat tatctattct ctccacatgt     420
cagccgccca ttcatatcat ggtttggaaa tgggggagaa atagattncc cttaaactgc     480
aagtcaacan ggggttcttt acagttaact ttagccaaat tcataccaaa tacccgggta     540
cctgcccngg cggccgttcn aaa                                             563
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<210> 285
<211> 422
<212> DNA

<213> Homo sapiens

<400> 285
acaatggact ggatactaga aattttcttt tcactcaaca gaacataggc atcctggaat 60
tcacatttct gacctttttga tgtattaata aagtatggag aaatatagcc tcgatcaaac 120
ttcatgcctt caataatttc taattcatca ttcagtgttt ttccatcctt tactgtgatg 180
acaccctttc ttccaacttt tttcattgca tcagagatga tattgccaat ttctttgtct 240
ccgtttgcag aaatcgtagc aacctgtgca atttcttcag gggtggtcac aggtttagac 300
tgctttttaa gttcagcaat tacagcatca acagctaaca tcacacctct cctgatttcc 360
actggattag cacctttgct aatcttctcg aagccttctt ggctatagag cgtgccagta 420
cc 422

<210> 286
<211> 588
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(588)
<223> n = A,T,C or G

<400> 286
actgttcctg caggttaagg caggactgga actcctccac agcttgcaca tagttttcag 60
attcaacact aacttctccg agtttaagat gtgcctgggc agcataaagc tgtgcttctt 120
ttgtttcttg ccttttaaaa atgatctttg ctaaatccag catatcccag gcaagctcta 180
ggttcccaat ctcctcctcc tcattttctt gaagagactt gttttcaagg actgaatcat 240
ttggcatttc ttcggtctta tcattttctt tatcatcctc ttctgagcct tcagtttcat 300
ctatgttatc attattttct accagagatt catcttctgn tntttctcc ttcttcctct 360
tncacatgca caccttccaa ggcgtttcca acacaccatt cttcatcttg ccaacttcag 420
aagtggattt ccatagaaaa agaangnttn ttcacactta ttaactgctc ttcatacttt 480
ttacctnaaa gactaactgn ttcctggaat gcattggccg ctgctnggaa atccccatan 540
cngaagttnt ggcctaancc aaagttntta gttactttcc catccgac 588

<210> 287
<211> 583
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(583)
<223> n = A,T,C or G

<400> 287
actggaactc caggaagcgc tggccagcct catacgggag ccatttttct ttcactgcct 60
ctgctgctga catcttcttc tttcccttca caccctcgaa gcctatgaag gctttctgag 120
caggcttcag cctggtggcc atgtcttggt caatcacacc ctgggagact gcgtcctgaa 180
gtgacagctt ctggcccgtg gttgggtgga tgatgccacc tgtgcaggcc tgagcctcca 240
gaagcctctg acccgtgatg ctgtcaacga tgccccgctc tataccttct gtaatggaga 300
ttttctccag gttttctgtg tcaaagatgg ctgcaatggg gctcgattct tncagggtgt 360
ctgaaaaaga actgctcctt atggntaaat tcctgacctg gatatggtgg aaatcttact 420
tactgattca tgtcgggagc tgctaaaaac atnatcgttg caccactggc catgctgtgn 480

ttggngccac accatttttn angngacatg taacnaattg antaggttag nttccgaacg 540
gaccttggcc ggaacaccta aggngatcan ncatggggcg tnn 583

<210> 288
<211> 607
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(607)
<223> n = A,T,C or G

<400> 288
ggtacttttt tttttttttt tttttttgtt atttagtttt tatttcataa tcataaactt 60
aactctgcaa tccagctagg catgggaggg aacaaggaaa acatggaacc caaagggaac 120
tgcagcgaga gcacaaagat tctaggatac tgcgagcaaa tggggtggag gggtgctctc 180
ctgagctaca gaaggaatga tctggtggtt aagataaaac acaagtcaaa cttattcgag 240
ttgtccacag tcagcaatgg tgatcttctt gctggtcttg ccattcctgg acccaaagcg 300
ctccatggcc ttcacaatat tcatgccttc tttcactttg ccaaacacca catgcttgcc 360
atccaaccac tcagtcttgg cagtgcanat gaaaaactgg gaaccatttg gggttgggtc 420
cagcattttg catggaccan aatgccagga cccctatgct ttaaggatga anntcttatn 480
ttnaaatttc ttcccataaa nggcttgcca ccaangccat tatngcgngt gaagcaccac 540
ctgacccata accctggaat aattntnnga aaaccggacc cttntaccna atctttttc 600
aggggnn 607

<210> 289
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 289
actttttttt tttttttttt tttgagaatg aataagcagt tctttaatgg ttatttaaat 60
atattccaga agagcgttta taattcattt acaagtgcag tattgcgcta gtaaatgtta 120
cttgacctct tgtataaata atgccgatta agaattagtc ctggaatagt tttcgaattt 180
ctaactctgt agatctaaaa cacaattgta aatggtataa agatgtaaga atcatattgt 240
gataaagtca atctcaaaaa tagagaatcc agacccttcc cagataattt aagaactgag 300
ttttcctcaa cttaaacatg atggccacac agaaaacagt aaagacactt ttcgatgtga 360
tacaactgga taaaactcga gaatatgagt atttagngac caatgnatan acattantgg 420
aattttaaaa ncccttttaa tctgaagccg aaaaaaangc cattttccaa gaattattgn 480
gccctaatca tcatcnannc nngaatanna tncnttcccn ggatagnnnn nnntccncct 540
tnggaaantg ggccnaantt ntttggtntn aaagggggnc cnttaantcc n 591

<210> 290
<211> 592
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(592)
<223> n = A,T,C or G

<400> 290
ggacttggaa atggttgtct ggaaagcttc cactttggtc ttgacggcat tcaccctctc 60
cagcaccttc tcctggattg ctaccccaaa atcatttcca tcttcaatct tggggatcag 120
gtgttggatc catgtaatca ccagaatgca tttctctttg agagtccaga cttctggctt 180
aaccagggca agcagggaca ggactttctc attcccaggg agaaatccac acttagggac 240
ttctttcttc tcctgcttat ctgtttccat ctcatcatcc ttgggtggag ggtctgggat 300
ggggatgtcc agtggggccc ggagggaagt caagtcagcc acattgaggg agtcctcttg 360
caagagctga ttcaggtata tgattttctg tggcaagaat ctgtagagga attcctcanc 420
ctnctggaaa agaatctgtc tgaagacctt cacctggttg cgggctttcc cgctaagcgc 480
accccacacg gtttgggcct gctgntttaa tccttaanct ctggcttccg gntagtcccc 540
cgggaccttg ccggccggcc ntcaaagggc aattcancna ctggcggccg tn 592

<210> 291
<211> 609
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(609)
<223> n = A,T,C or G

<400> 291
acagtggcat gatctcggct cactgcaacc tctgcctccc gggttcaagc aattctcctg 60
cctcagccac ccaagtagct gggactacag gtgcgtgcca ccacgcccag ctaaattttg 120
tatttttagt ggagacgggg tttcaccatg ttggccagga tggtctcaat ctcctgaccc 180
tgcgatctgc ccacctcagc ctcccaaagt gctgggatta caggcgtaag ccaccgggcc 240
tggcctgttt tatgattctt aatagttact tggtttaaat cacatttgat actatccttc 300
tgaaaagtct gagacagatc tacaaactac agtcaaaatt atagattaag aggaatgaat 360
gcacctattt ggctttaagt tgaagatgaa ttatttctca tgctcatttt cttgcngcag 420
ttatcttaga aagacccccca aaggcttgtg attgtaaagc acttgcatga tcacagaatg 480
caagcttctg gtaccttcgg ccgtgacacg ctaagggcga attcatcaca attgcgggcc 540
gtacctatgg atccannctc ggtccaactt ggcggaatca tgggcatact gnttcctggn 600
nnaaatgtn 609

<210> 292
<211> 568
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(568)
<223> n = A,T,C or G

<400> 292
actgcccaga aggagttcat aaagaataca aagaagaccc caaaagatgt cacgatggca 60
ctattgaatt cacgagcatc gatgcacaca atggtgtggc cccatcaaga cgtggtgatt 120

tggaaatact tggttattgc atgatccaat ggcttactgg ccatcttcct tgggaggata 180
atttgaaaga tcctaaatat gttagagatt ccaaaattag atacagagaa aatattgcaa 240
gtttgatgga caaatgtttt cctgagaaaa acaaaccagg tgaaattgcc aaatacatgg 300
aaacagtgaa attactagac tacactgaaa aacctcttta tgaaaattta cgtgacattc 360
ttttgcaagg actaaaaact ataggaagta agggtgatgg caaaatggac ctcaatggtg 420
tggaaaatgg angnttgaaa gccaaaacca tnnnnnaaaa ncttagggcg aattccannc 480
actggcggcc gtnctaangg atccagcttg gncccaactt ggggtaatca tgggcataac 540
tggtncctgg ggaaaatggt ttcccnnn 568

<210> 293
<211> 603
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(603)
<223> n = A,T,C or G

<400> 293
ggtacttttt tttttttttt tttttttttt tttttttctt tttttttttt tttttngcct 60
ttttaanaaa cttttatttg agnggntntt acaaanattg nngcaatatg aaagtcattt 120
gtttgatana aatatcaagc tgncttgtca aacacnctga agtaacccaa aaatntnttt 180
caaagctcac anagcttaaa aagagcnaag attntntgca accagacaaa acctatttnt 240
gcatttccta tttctttctn aaactgnttt gcctaccaaa ctttnacgtt taaacatttt 300
caggaaatgc aggatcatt ttgtttggaa ttttaagacc ccccngaacn cataggtntt 360
tacaaagaaa cttttcccga tcccttaatt gaaaagaacc ntccnaaata taaantttgn 420
aaactcccnt ttttggccaa ttgatcanaa tgccagaaga natgctaacc naanagccct 480
ttaactgggc tgggattcca taccctaaan ggggtttcaa aactggttaa ccttnnccca 540
attttaacct tngggaaaag ggnaaaggan ccccggggna aaaataaggt tttgaaaaat 600
aaa 603

<210> 294
<211> 617
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(617)
<223> n = A,T,C or G

<400> 294
ggtacgcggg gatcgcttcc tggtcctcgc cccctccgct gtctccctgg agttcttgca 60
agtcggccag gatgtctcag gctgagtttg agaaagctgc agaggaggtt aggcacctta 120
agaccaagcc atcggatgag gagatgctgt tcatctatgg ccactacaaa caagcaactg 180
tgggcgacat aaatacagaa cggcccggga tgttggactt cacgggcaag gccaagtggg 240
atgcctggaa tgagctgaaa gggacttcca aggaagatgc catgaaagct tacatcaaca 300
aaagtagaag agctaaagaa aaaatacggg atatganaga ctggatttgg ttactgtgcc 360
atgtgtttat cctaaactga gacaatgcct tgtttttttc taataccgtg gatggtggga 420
attcgggaaa ataaccagtt aaaccagcta ctcaaggctg ctcaccatac ggctctaaca 480
gattaggggc taaaacgatt actgactttc cttgagtagt tttaatctga aatcaattaa 540
aagtggattt tgtaccaaaa aaaaaaaaaa aaaaagtnct gcccggccgg ccntcaaaag 600

gcnaattcan ccccttg 617

<210> 295
<211> 606
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(606)
<223> n = A,T,C or G

<400> 295
cgaggtactt ttaccatgaa catctctaga ctgtgattat taaatatagt gataatatac 60
atgggtttac tgggatattg aaaaataaaa gataatgaac ccaatttagt aaatcaacat 120
aaatacaaaa cagagcgaat tagccctcta caactgagct cgtcctgcgt cttgagcttg 180
ggttctttct ggaactgtct caaaccttag tgggggaagt gaccttatcc acagattgct 240
tttcccagag gttccgcttg ctggatacgt ctcctggtct caagtcagaa ggtttgggag 300
caggtgactt gtttccatct ggggttttag ttagccattc attgatgccg ctagaaaccc 360
ctaccttcaa gccagcagtt tccttatttg gtgtgcctgc tgcantgggg gatgaaaaca 420
cattcctttc tnccacatac tcttggatgt tgcgtacctg cccnggcngg ccgttcnaaa 480
ggccaattcc acaccactgg cggccgtact aatggatcca aaactcggac cancttggcg 540
natcatnggc atactggttc ctggggnaaa tggattccgt tacattcccc caacttccag 600
ccnggg 606

<210> 296
<211> 612
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(612)
<223> n = A,T,C or G

<400> 296
ggtacgcggg gtgccagagg aaatcttaaa gcgcctactt aaagaacagc acctctggga 60
tgtagacctg ttggattcaa aagtgatcga aattctggac agccaaactg aaatttacca 120
gtatgtccaa aacagtatgg cacctcatcc tgctcgagac tacgttgttt taagaacctg 180
gaggactaat ttacccaaag gagcctgtgc ccttttacta acctctgtgg atcacgatcg 240
cgcacctgtg gtgggtgtga gggttaatgt gctcttgtcc aggtatttga ttgaaccctg 300
tgggccagga aaatccaaac tcacctacat gtgcagagtt gacttaaggg gccacatgcc 360
anaatggtcc cgcaggaagg ccgtcaagaa nggctcgacc cggntggtgt ttcaaggaag 420
aaacattgtg gtcttggtgt ggaaaaaaaa tcantgggcc aactggngga tgaaagacna 480
tgccggaana nctgggcttt ggatgacaac ccctgcatgg gcttttgang ccttaccgcc 540
gatccagggt tntnttaaca nggcccggtg gaatgccnaa nccccggtta ctttggagga 600
cccggtnctt gg 612

<210> 297
<211> 590
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(590)
<223> n = A,T,C or G

<400> 297
acgcggggga acacatccaa gcttaagacg gtgaggtcag cttcacattc tcaggaactc 60
tccttctttg ggccacggaa ttaacccgag caggcatgga ggcctctgct ctcacctcat 120
cagcagtgac cagtgtggcc aaagtggtca gggtggcctc tggctctgcc gtagttttgc 180
ccctggccag gattgctaca gttgtgattg gaggagttgt ggctgtgccc atggtgctca 240
gtgccatggg cttcactgcg gcgggaatcg cctcgtcctc catagcagcc aagatgatgt 300
ccgcggcggc cattgccaat gggggtggaa ttgcctcggg caaccttgtg gctactctgc 360
agtcactggg aacaactgga ctcttcngat tgaccaagtt catcctgggc ttcattgggt 420
ctgccattgc ggctgcattg cnaggtctac taacttcctg cccttgcctt gcaaaaaaaa 480
aaaccttgcc agggaaaaag nccccaancc ttctgaacca accanggggc ccacttttcc 540
aaaatacctn gggnggaaaa tncccaattt tgantttcnn aggaaanana 590

<210> 298
<211> 590
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(590)
<223> n = A,T,C or G

<400> 298
ggtactttga gccactctcg catggaaagg agtgtcttta tgcctcgacc tcaagctgtg 60
ggctcttcca attatgcttc caccagtgcc ggactgaagt atcctggaag tggggctgac 120
cttcctcctc cccaaagagc agctggagac agtggtgagg attcagacga cagtgattat 180
gaaaatttga ttgaccctac agagccttct aatagtgaat actcacattc aaaggattct 240
cgacccatgg cacatcccga cgaggacccc aggaacactc agacctccca gatttaacta 300
aacaaaagaa actctccacc tagcactgtt tttcttcatt gcttactgag agggttttttg 360
agaacttaat ctgggggggag aactgctttc tcagatcctt aactcccgag aagagaagtc 420
cttgtgcaca gaacttgtgg gaaccttcat ccgntgtctt tacctttgga tccagtgtgc 480
aagtttcatg acngaatcat taagatatca aatggcctaa tttggngcna atcatggtat 540
actgggaaaa ttaggcnaat ggaacttntc accgantttg gtctttaaan 590

<210> 299
<211> 549
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(549)
<223> n = A,T,C or G

<400> 299
cgaggtacaa agatctgaca tgtcacccag ggacccattt cacccactgc tctgtttggc 60
cgccagtctt ttgtctctct cttcagcaat ggtgaggcgg ataccctttc ctcggggaag 120
agaaatccat ggtttgttgc ccttgccaat aacaaaaatg ttggaaagtc gagtggcaaa 180

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gctgttgcca ttggcatcct tcacgtgaac cacgtcaaaa gatccagggt gcctctctct      240
gttggtgatc acaccaattc ttcctaggtt agcacctcca gtcaccatac acaggttacc      300
agtgtcgaac ttgatgaaat cagtaatctt gccagtctct aaatcaatct gaatggtatc      360
attcaccttg atgaggggat cggggtaacg gatggtgcgg gcatcatgag tcaccagatg      420
anggattcct tttgtgccca caaagatctt tctactttgc ancacacact ggcggncgta      480
ctagtggatc cacttcgnac caacttggcg tatcatgggc tnactggtnc cgggggaaat      540
ggtatccnn                                                              549

      <210> 300
      <211> 591
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(591)
      <223> n = A,T,C or G

      <400> 300
actccagcct gggcgacaga gcaagactcc acctcaaaaa agaaatattt agcaaatatt       60
aaaggacaag agggaatatc tgtttaaaaa attataatgc acgttagatg aaaagtaata      120
ggatgagatg gttgttgctg aaatagcact tgctatataa attcaaacat tccttttcaa      180
attcagcttc tcagaggttt gacttcagat gcttgagcac tttcaacatt atctttgcct      240
ttatccttcn ttatgcggat aaacacaact gctaaaatta taccattgat tttggaaact      300
tcccagtcgt tttgtaagct tcactgccga gggaaaatgt aaaatgggga ccccgaaata      360
aagtgctgat catcatcaag tagcctcgaa aatgagactt tcaggtgcac tgaaggggat      420
ggcagaagaa caagccccgt gtagtccttg ctagcctggg aaggttggca ttcacatcct      480
taaggatcan gtggactttg acnccgaact taaaggaaga accccctatt ntggggccac      540
cacttgacct tgggccggaa cacccttaag gcgaattcca cacactgggg g               591

      <210> 301
      <211> 655
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(655)
      <223> n = A,T,C or G

      <400> 301
cgaggtactc tttaaaaagg gactgcaggg ctgggtgtag tggctcacac ctgtaatccc       60
agcactttgg gaggccaagg caggtgggtc acttgaggcc aggagtttga gaccagcctg      120
accaacatgg caaaacccca tctctactaa aatacaaaaa ttagctgggc atgatggtgc      180
actcctgtaa tcccagctac ttggtaggct gaagcatgag aattgcttaa acctgggagg      240
cagaggttgc agtaagccaa gatcatgcca ctgcactcca gcctgggcaa cagagtaaga      300
ctctgtctta ataaataaat aagaaaataa aacggaactg cagtgctaac agtaatttat      360
acatttttaa atgttctgag tatgttttga ctgggctagt gtaacaatat actaccctga      420
aaagtgcagt tttgattgtt ggtggtgtct ttgggtcang aaaagtgaac tgtgccaaga      480
agtatttttc aatgacatga atggattnct gttaatgcaa ttgactgaga aaatgngctt      540
acgctttctt aactgcaaaa agagntttgt ccacatcana attgttgaaa ctggngctgt      600
ttctgttgcc tgggatctga tgactgggat ttcctcttgg acaaaanacc tgatn           655
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<210> 302
<211> 513
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(513)
<223> n = A,T,C or G

<400> 302
actcgtcttg gtgagagcgt gagctgctga gatttgggag tctgcgctag gcccgcttgg 60
agttctgagc cgatggaaga gttcactcat gtttgcaccc gcggtgatgc gtgcttttcg 120
caagaacaag actctcggct atggagtccc catgttgatg gatcctgagc ttgaaaaaaa 180
actgaaagag aataaaatat ctttagagtc ggaatatgag aaaatcaaag actccaagtt 240
tgatgactgg aagaatattc gaggacccag gccttgggaa gatcctgacc tcctccaagg 300
aagaaatcca gaaagcctta agactaagac aacttgactc tgctgatttt tttttccttt 360
ttttttttta aataaaaata ctattaactg gacttcctaa tatatacttc tatcaagtgg 420
aaaggaaatt ccaggcccat ggaaacttgg atatgggtaa attgatgacc aataatcttc 480
acttaaagnc atgtcctttg gccgcgaaca cgc 513

<210> 303
<211> 610
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(610)
<223> n = A,T,C or G

<400> 303
acgcggggct tgcagagccg gctccggagg agacgcacgc agctgacttt gtcttctccg 60
cacgactgtt acagaggtct ccagagcctt ctctctcctg tgcaaaatgg caactcttaa 120
ggaaaaactc attgcaccag ttgcggaaga agaggcanca gttccaaaca ataagatcac 180
tgtagtgggt gttggacaag tnggtatggn gtgtgctatc agcattctgg gaaagtctct 240
ggctgatgaa cttgctcttg tggatgtttt ggaagataag cttaaaggag aaatgatgga 300
tctgcagcnt ggggagctta tttcttcana caccttnaaa ttgtgggcag atnaagatta 360
ttctgtgacc cgtcaattct tanattngta gttggtnact gcatggaatt cngtcagcaa 420
gaaangggaa aantctngtt caatttggtn gnataagaan tggttaatgg tcttcaaatt 480
cnttattcct tcagancggc caagtacctn ggccgnganc atgcctaagg gctaattcna 540
ctcantggng gccgntctan ntggattcca ncttggtacc aancttggng ntattnatgt 600
caatanctgg 610

<210> 304
<211> 596
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(596)
<223> n = A,T,C or G

<400> 304
ggtacctgga attatctaat tggccagagg tggcgcccga cccatcagtt cgaaatgtag 60
aagtaataga gttggcaaaa gaatggaccc cagcaggaaa agcaaagcaa gagaattctg 120
ctaagaagtt ttattctgaa tctgaggaag aggaggactc ttctgatagt agcagtgaca 180
gtgagagtga atctggaaag tgaaaagtgg agaacaaggc cgaaagtggg ggaggaagga 240
gacagcaatg aggacagcag tgangactcc tncagtgagc angacagtga gagtggacgg 300
gagtcaggcc tagaaaacan angaacagcc nagangaact caaaagccaa agggaaaaag 360
tgattctgaa gatgggggaga aggaaaatga aaaatctaaa acttcagatt cttcaaatga 420
cgaatctagt tcaattanaa gacagttctt ccgattcttg aatcagaatc agaacctgaa 480
agtgaatctt gaatncngaa cagtcgctta ggagaaagaa agaaaccaag caggattgac 540
tccttttncc aagntgttcc ttctaaactg gatgatttaa ccngntccct cagtgn 596

<210> 305
<211> 629
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(629)
<223> n = A,T,C or G

<400> 305
ggtactttnt tttttttttt tttttttttt tttttttttt tggggattta ntttttattt 60
cataatcata aacttaactn tgcaatccan ctaggcatgg gagggaacaa ggaaaacatg 120
gaacccaaag ggaactgcag cgagagcnca aanattntng gatactgcga gcaaatgggg 180
nggaggggng ctntcctgag ctacaaaagg aatgatctgg tggntaaaat aaaacacaag 240
tcaaacttat tnnagttgtc cacagncagc aatggngatc ttcttgctgg ncttgccatt 300
cctggaccca aagcgctcca tggcctccac aanattcatg ccttctttna ctttgccaaa 360
caccacatgc ttgccatcca accactcant cttggnagng cagatgaaaa actgggaacc 420
atttttnttg ggtccnacat ttccatggca aaangccang acccnttgct ttaagaagaa 480
aatctcatct tcaaattctn ccctaaanga cttgccncan gccntntggg tgngaagcnc 540
cccctgncca taaccctgga tatttttgaa agagganccct ntacnaacnt ttttccnggt 600
aanaaaaaat tttttntttg acctnccca 629

<210> 306
<211> 643
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(643)
<223> n = A,T,C or G

<400> 306
acagggagga atttgaagta gatagaaacc gacctggatt actccggtct gaactcagat 60
cacgtaggac tttaatcgtt gaacaaacga acctttaata gcggctgcac catcgggatg 120
tcctgatccc ccgcgtacat ttccttgtag actctgttaa tttcctgcag ctcctggttg 180
gttctggagc agatgatctc aatgagagag tcctcgtcgg ttcccagccc cttcatggaa 240
gcttttatct cagaagcgtc atactgagca ggtgtnttca ataggcccaa aatcaccgtc 300
tccaggtggc cagataaggc tgacttcaat gctgatgcaa gntccttttt ggtccttctc 360

tggtaggcga aggnaatatc ctgtctctgt ncattgcttg cggntgggca aaatgttgac 420
aatggtgacc tcatccacac ctttggtctt tgatggntgg ntcaatgttc aaagcatccg 480
ctcagcatca aaantaagta tangctttgc agacccatat gcacttgggg gngnngagng 540
acaccctcca actgaacttg ccaggatttn tgaaagtaan antttaaga acttgccgnc 600
cccanactaa acnnccaatc tagcccnntn cctaacggcc aag 643

<210> 307
<211> 643
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(643)
<223> n = A,T,C or G

<400> 307
cgaggtactt tttttttttt ttttttttnt ttnttnttnn tttggggatt nanttttat 60
ttcataatca taaacttaac tctgcaatcc aactaggcat gggagggaac aaggaaaaca 120
tggaacccaa agggaactgc ancgagagca caaanattct nggatactgc gancaaatgg 180
ggnggagggg tgctctcctn agctacaaaa ggaatgatct ggtggttaan ataaaacaca 240
agtcaaactt attcnagttn tccacagnca gcaaagggga ncttcttgnt gggcttgcca 300
ttcctggacc caaaacgctc catggnctcc caaaatttat gcctttttt actttgccaa 360
anaccacatg ctttgccttc caccnctcan tttttgnggg ggnaaataaa aancgggaac 420
cnnttgtgtt tggnccnaca ttttccnttg gnaaaaaacc ncgacccctt tntttaagaa 480
naaaatttta nttttaaaat tttcccctaa aaaggactgg cccnaaggcn ttttgggggn 540
gaagcccncc ntccccnaaa cctggaaaaa ttttggaagc nggaccettt accaaatctt 600
tntcctggtt aaaaaaaaat ttttttttt gacctttccc aan 643

<210> 308
<211> 653
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(653)
<223> n = A,T,C or G

<400> 308
cgaggtacag agagtagctt ctgtgatgca agaatatact cagtcaggtg gtgttcgtcc 60
atttggagtt tctttactta tttgtggttg gaatgaggga cgaccatatt tatttcagtc 120
agatccatct ggagcttact ttgcctggaa agctacagca atgggaaaga actatgtgaa 180
tgggaagact ttccttgaga aaagatataa tgaagatctg gaacttgaag atgccattca 240
tacagccatc ttaaccctaa aggaaagctt tgaagggcaa atgacagagg ataacataga 300
agttggaatc tgcaatgaag ctggatttag gaggcttact ccaactgaag ttaaggatta 360
cttggctgcc atagcataac aatgaaagtg actgaaaaat ccagaatttc agataatcta 420
tctacttaaa catgtttaaa agatggtttg tttgcaagac tttttgcata cttanttcta 480
catgaattaa atcactggtt tnaaatgaca cttattaatc ctaataactg gtnaacccnc 540
aaaaaaaaaa aaaaaaaaaa ntacttnccc ggcggccgtc gaanggcaat tcacncctgg 600
cggccgtcta tggatccacc cggnccacct gggnaacagg cnactggttc tgg 653

<210> 309

<211> 649
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(649)
<223> n = A,T,C or G

<400> 309
acttgcaaaa gcacttgaag tcattaaacc agctcatata ctgcaagaga aagaagaaca 60
gcatcagttg gctgtcactg catacсttaa aaattcacga aaagagcacc agcggatcct 120
ggctcgccgc cagacaattg aggagagaaa agagcgcctt gagagtctga atattcagcg 180
tgagaaagaa gaattggaac agagggaagc tgaactccan aaagtgcgga aggctgagga 240
agagaggctg cgccaggaag caaaggagag agagaaggag cgtatcttac aggaacatga 300
acaaatcaaa aagaaaactg tccgagagcg tttggagcag atcaagaaaa cagaactggg 360
tgccaaagca ttcaaagata ttgatattga agaccttgag gaaatggatc cagattttat 420
catggctnaa cagggtgaac aactggagaa agaaaagaaa gaacttcaga acccttaaga 480
atcagaaaag aagattgctn ttttgaagac ccacctttgg aaaaattcct ttgttaagag 540
cctttcgagg acagaaaatt aagacatggt ctggggngcc cccgaggaga aagaattctc 600
ctgcccttga cgtgaaaggt nttgcataaa atcatgtccn atcttgaga 649

<210> 310
<211> 319
<212> DNA
<213> Homo sapiens

<400> 310
cgaggtacta gccggacttg gattttctgg aaagatttca gttgaggaac gggaacaaag 60
attatgatag ctttccgacc accaccaact tcaatttcct tagctgccgt aatattcagc 120
tccctgagct gagccttgag gtccgagttc atctccagct ccagaagagc ctgggagatg 180
ccggactcga actcgtccgg cttctcgcca ttgggcttca cgatcttggc gctcgaactg 240
aacatggctt tctcctggga gaacttgccg agcgccggct taggaagaga ccccgcgtac 300
ctgccgggcg ggcgctcga 319

<210> 311
<211> 646
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(646)
<223> n = A,T,C or G

<400> 311
cgaggtactg atgcaacagt tgggtagcca atctgcagac agacactggc aacattgcgg 60
acaccctcca ggaagcgaga atgcagagtt tcctctgtga tatcaagcac ttcggggttg 120
tagatgctgc cattgtcgaa cacctgctgg atgaccagcc caaaggagaa gggggagatg 180
ttgagcatgt tcagcagcgt ggcttcgctg gctcccactt tgtctccagt cttgatcaag 240
ctgcacatca ctcangattt caatggtgcc cctggagatt ttagtggtga tacctaaagc 300
ctggaaaaaa ggaggtcttn tntggcccca aaccaatgtt ctgggctggc caatgacttc 360
acatggggca atggcaccaa caccggcaga acttgnaccc tattgccaca acatgtcctt 420

```
atctnaatga nggncttctt tgtgaaaaca aaccccattc cccggaatta agnacaantt     480
cttcaaactt gggtggnttc aagggcctcg atngcctgcc catatngggt ttttgccata     540
aaacacaacn ttccnnaaag gaatccgant nttgttttgt tgganccccat ttttgttccc    600
aagaaaattn ggtaatatcc aaattgggga attaggaaaa tgggnt                    646
```

<210> 312
<211> 622
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(622)
<223> n = A,T,C or G

<400> 312

```
cgaggtactt ttgtgagagg gttcaatggg agagctttaa tgcagatgag acttgaagct      60
tctgaagaag atctaagtct tgatgaggtt attcaaactc aaatcttgaa tgcataatga     120
tgataggcca tggtcttcaa aaacgtggta cttttaatag caacagggtt tcaccatgtt     180
ggccaggctg gtctcaaatt cctgacctca agtgatctgc ccacttaagt gctgggatta     240
caggcatgag ccacaacatc tggccagaaa tatttttct tttctttctc tttctctctc     300
tcttttttt ttttttttt tttggagctc gctctgtccc ccagctgcaa tgcaatgggg      360
caatcttaac ttactgnaac ctccccttcc aggtcnaaag aatctttgng ctacctccta     420
natntnggaa tacaagggcg tcccccacct actaattttg ntttttaaga aaaggagggt     480
ttancatgtt ggtnngntga tcccaacctc cgaccttaan gancctccgc ctaatttcca     540
aaggctggat nttggctgan cccaccccnc ttaaccaaaa ttnaaattct tttntcctgc     600
cgggggcgtt aaagggaatc aa                                               622
```

<210> 313
<211> 674
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(674)
<223> n = A,T,C or G

<400> 313

```
nggacttgaa atcattgaag ttctgcaaaa aggagatgga natgcacaca gaaagaaaga      60
tacagaggtc cgcagacggg agctcctaga atccatttct ccagctttgt taanctacct     120
gcntgaacac gcccaagacg tggtgctaga taagtcagcg tgtgngtagg tntctgncat     180
tccngggaac agacnaattn gaccatnagg naacctgagc ttnccaaagt ncgcaaggct     240
gaagaagana ggctnctcca ggaagccnac gagaaagana aangagccgt attttacncg     300
aacatgaaca aatcaaaaaa naaaactgtc cgaaaaccgt ttggagcaaa ncaaanaaaa     360
cagnacctgg gngcccaaag cattcnaana tatttgttat tancncaccn tgatggattc     420
naaacnttat ttttncttgg cncggctggn ccgcccggct ngngnaaaga aaagaacttt     480
nctaccnctc ccgaatcaag aaaagaanat ggctttttn taaaanncaa cccttgggaa      540
aaaattcttt gtttaananc cctccaangc ccgggaaatt aattcatgct ttgtgtgngc     600
gaccnannaa aaaanaanan atccttcctt ccccttaann gaaaagggcc ttncaaaaaa     660
tgattgccca agnc                                                        674
```

<210> 314

<211> 646
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(646)
<223> n = A,T,C or G

<400> 314
acttttttt ttttttttt ttttttttt tttgagatgg agtcttgctc tgtcgcccag 60
gctggagtgc agtgttgcga tctcagctca ttgcaacctc tgcctcccag gttcaagtga 120
ttctcctgcc tnagcctcct gagtagttgg gactacaggc acatgccacc atgcctggct 180
aatttttttg catttttaag tanagacagg gtttcatcat gttggccagg caggtntcaa 240
actcctgacc tcaagtgatc cacctgtctc agcctcccaa agtgctggga ttacaggcat 300
gagccactgn acccggccta aaaatgatta cttcttataa aaaggatttc ttccccttca 360
caacacttan cttccttttt ctttcctggn aactatgggt ntggngnccg cataaggatc 420
taccttncnc aagctggaca ntgggggttg ctncttgang gnaactcagg ccanatacng 480
accctggggg gaacnctaaa cttacttggg tanaacccgg gctaacattt ctgcttgnga 540
ngttgattcc ccncaaattt ttaaaaggnn tttcatggcc cttagggcaa ccattttaca 600
aagatgggnc acatggnctt ggccgnaacc cctangngaa ttcncn 646

<210> 315
<211> 666
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(666)
<223> n = A,T,C or G

<400> 315
acagtctttg gatatttagg aaggggatgg ggagaaagtc agttctcaga acaaattagt 60
cagcttcagt ctcgtcagca gggtctttgg attctttgtt cttccgcact tcttcaatgt 120
gcttatcctt ctctcgcaaa cgttccagtt tggcagccat ttgtgcctct cggttctctt 180
tattagcttc cattttgtgg gtcagtttct cttctgccat tttactgaag ttgntgttct 240
cttctattgc cttctgaagc acttctttct cgtgctctcg tttctcancc agctgcttca 300
agaccttagc ttcatgggac ttgcgtcttt cttctgcagc ttctaatttc ttctgaattt 360
cctccaggga aagaccttct tctttggaag ggaaaggggg aattctggaa ccagattctt 420
ttgacccaag gctgaaaatc agcttaaaag cctggccttg angcacccnt tttcagntct 480
ttcacctgga tatcntaaag aagccctngt gattnaaaac aagccnaccg gcantnnatt 540
ntgncaanan cnnggataan gnaatccctg tnaantccna cccctnaccc cattttcccg 600
ggaccttggc ngnaacccct tanggngaat tcnnccnctn ggcggccgta ctaangggac 660
ccaccg 666

<210> 316
<211> 656
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature

<222> (1)...(656)
<223> n = A,T,C or G

<400> 316
actcttggtt tgtcaatggg actttccagc aatccaccca agagctcttt atccccaaca 60
tcactgtgaa taatagtgga tcctatacgt gccaagccca taactcagac actggcctca 120
ataggaccac agtcacgacg atcacagtct atgcagagcc acccaaaccc ttcatcacca 180
gcaacaactc caaccccgtg gaggatgagg atgctgtagc cttaacctgt gaacctgaga 240
ttcagaacac aacctactgt gggtgggtaa ataatcagag ccttcccgnc aagtcccagg 300
cttgcagctg gccnatgacc aacaggaccc tnactctact tagtgtcaca aggaatgatg 360
ganggaccct atgaagtgtg gaaaccagaa ccaattaagt ggtgnccaca cganccaggc 420
attcttgaat ggcccttatg gnccanaaga acccaccatt tcccctnata cacctaatnc 480
cgtccagggt gaaccttaag ctntctggca tgcaancctt aaccactggc aggattcttg 540
gnttaatgaa gggaacattc nnacccnccc agaagttttt attttcaact tacttggaan 600
aacgggggct ntttactgcc ngccataact taacnggggc cnnancggac ttcgnn 656

<210> 317
<211> 636
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(636)
<223> n = A,T,C or G

<400> 317
actttttttt tttttttttt tttttttttt tttgnagtca gctatttaat taggttctta 60
agacatttag aacaccaatt tgngaggata aattccattc gtcagagcaa acacagatcg 120
caggtagccc tggagctgag gaatagcttt gatttttggt aaaatttgtg agtccacagc 180
tttctgatca atcttgcgct gctccgtaat ctcatatttc ccttttttctg ggncgaaaan 240
cttacctttc tggggnntgg gcttncgcag cttcttcttn ttgaagtaag catnagtaan 300
aagntttggg anttttacan tgntgatann cattttggnt gaagnggnan tgacnaattt 360
ctgggggggt cttcgtaaag gaactcnant gaggcccaag ggnccgtccn agtaataagg 420
ccctnncanc tggttangga aaccccctnt tggcctgggg ggnccangag gntgatccaa 480
atggccccgg ggaaaagcng gntcaanttt tnacggctnc tnaaagggtt ttgccnggnt 540
taanctttnn ggncnttttc agnggaaana ccngctttgn nantntaccc ccggntcctc 600
ggcggaaacc nttagggnna attncncnct gggggg 636

<210> 318
<211> 654
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(654)
<223> n = A,T,C or G

<400> 318
cgaggtacgc ggggcctttc tgcccgtgga cgccgccgaa gaagcatcgt taaagtctct 60
cttcaccctg ccgtcatgtc taagtcagag tctcctaaag agcccgaaca gctgaggaag 120
ctcttcattg gagggttgag ctttgaaaca actgatgaga gcctgaggag ccattttgag 180

caatggggaa cgctcacgga ctgtgtggta atgagagatc caaacaccaa gcgctncagg 240
ggctttgggt ttgtcacata tgccactgtg gaagaggtgg atgcagctat gaatgcaagg 300
ncacacaagg tggatggaag aattgtggaa ccaaagaaaa ctgtcttcag agaagattct 360
taaagaccan gtgcccactt aactgtgaaa aagatatttg gtggtggcat taaagaagac 420
actgaagaac atcactaaga gantattttg aacagtatgg anaaaattgn agngattgaa 480
atnatgactg ccnangcagt ggcancaaan ggggctttgg ctttnnacct ttgacnacca 540
tgactcnngg ataaaatggn attcnnaaat ccctcntgng aatggccnca ctgggaagtt 600
ngaaancctn ncaacnagaa agggtncgnt tnntccncca aangcnaang tttc 654

<210> 319
<211> 659
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(659)
<223> n = A,T,C or G

<400> 319
acgcggggaa gccaactcag actcagccaa cagagattgt tgatttgcct cttaagcaag 60
agattcattg cagctcagca tggctcagac cagctcatac ttcatgctga tctcctgcct 120
gatgtttctg tctcagagcc aaggccaaga ggcccagaca gagttgcccc aggcccggat 180
cagctgccca gaaggcacca atgcctatcg ctcctactgc tactacttta atgaaagacc 240
gtgagacctg ggttgatgca anatctctat tgncagaaca tgaattnngg caacctggtg 300
tctgtgctna cccangccca aggtgccctt ggggcctcac tgattaanga aantggcact 360
gatgacttca atggctggaa tggccttcat gaccccnaaa aagaacccgc gnttgcactg 420
gacagtgggt ccctngntct cttacaagtc tggggcaatt gganccccaa nccatgntaa 480
ttcnggctac tggggtgagc nnacctcagc ccaggatttn gaantggaan gcctgncttg 540
ggaanacaag ttcttctttn gctngcaagt tcaaaaccta atgcagctgg aaaatcatnt 600
ctanaactga tcagcattcn accgnttcaa attaaccggc ctttttcant tanttaccg 659

<210> 320
<211> 664
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(664)
<223> n = A,T,C or G

<400> 320
ggtactctgc cttttaggag atgaggtaag acatatacat agatggcttt tactagccaa 60
ggcaatgtaa atggactaag attctcatgt gacttgaggt tatctgatga atttattctc 120
ttcaaaacca cctactttta gagggcatgt ttaacccctc tctttattta aggagggaga 180
gaaaaacaca tgtaaccaga attcagagtg ggttactcaa cctaagagaa catacggagt 240
tctctttggg aaaacgacaa gactacagtg ttcacttcgc accatgaagt ggcactcctg 300
ntatggctgc agantcctct tacttcttat gaaaggatgc atctgattct gaaattactg 360
atatattcga tcagttaggg atgntttaaa aagngaaaac caatgccaca catacacttt 420
ctagctttct gaaaatnacc cgacacattn ccnaaaatng agaatttacc ctattacttt 480
tagagaaatt tccataatat tcttgggtaa agaancccng ttgggcatat tnccaatttt 540
cagnggncnt ggttttatgc ccnaganccc aataggntcc cccatttttt aaggcttttt 600

ccacngacga tttttaaan cnttctnnan tgggggaaga ataatcttaa aagtngnctt 660
atnt 664

<210> 321
<211> 666
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(666)
<223> n = A,T,C or G

<400> 321
cgaggtacag tattacagtc agccacagaa gctgtgttgg gggacaagac ccaatccttc 60
cccacaccag gcaaagcagt attggacatg agttggcatg tggctgggcc cacgtcctta 120
tcccccaggc ctgaggggag accaccttct gatgataacc aacccctagc taccactctg 180
tattcatcag gggaggggta taaaccccgc atgcaagaag aacccttgcc cccagtgtca 240
aatgggatgg ggatgctaga gttatagtaa aggggaaacc ctatgtaagc tgntaacaga 300
gttcacaggg gtagggataa cccctgntct tcagctncca aatgngctca ctttccagct 360
tcttcatccg tcatcaatgc tggcaaagtt tccctnaact gnggccaggt tttcacgcat 420
gggtggctgc acctgggtca aaaaggtggn attggccntt aaggaattag caatcatntg 480
ctgggtggga ttccagtgtg taaggaactt anccaactgc atggnttgnt tgtgcanctg 540
cttgatggng acaagtttnt gcaccanctn aaggaaggtg gaagcatggg gctcaacctn 600
gataagttca tatacttggg gcnccttgct ttgggatctg catntttaca aggnttatcn 660
tggcan 666

<210> 322
<211> 631
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(631)
<223> n = A,T,C or G

<400> 322
accggaaagg aagctcccat tcaaaggaaa tttatcttaa gatactgtaa atgatactaa 60
ttttttgtcc atttgaaata tataagttgt gctataacaa atcatcctgt caagtgtaac 120
cactgtccac gtagttgaac ttctgggatc aagaaagtct atttaaattg attcccatca 180
taactggtgg ggtacatcta actcaactgt gaaaagacac atcacacaat caccttgctg 240
ctgattacac ggcctggggt ctctgccttc tccccttacc cttccggctc caccccttcct 300
gcaacaacag ccctntacct gggggcttg ntagaagaga tgtgaagggt tcaaggtcgc 360
aacctgtggg actactgcta ggtgtgtggg gnggttcgcc tgcacccctg ggttctttaa 420
gncttaaagt gatgcccctt tccaaccatt attctggncc cacacttctc actccggcct 480
tggncnanca taaatgnacc ccttcacttc ctntgagaat ggccttcgng aagaatcnag 540
gctttcccaa ncttctttcc ccccnttatc angggngctg gttttctnct ctcnaaggtc 600
ntttgaccgn accaccaaac ttctgaattn t 631

<210> 323
<211> 647
<212> DNA

<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(647)
<223> n = A,T,C or G

<400> 323
actgtgggtc gaagtaatgg atacggacgt aaccatcttc gccgccgctg ctgtagctct 60
tgccatcagg atggaaggca acactgttga taggtccaaa gtgacccttg actcttccaa 120
actcttcttc aaaggccaaa tggaagaacc tggcctcaaa cttgccaatc ctggtggagg 180
ttgtggttac atccatggct tcctgaccac cgcccaggac cacatggtca tagttggggg 240
agagggcagc tgagttgaca ggacgttctg tccggaaagt cttctgatgt tcaagagttg 300
tggagtcgaa aagcttggct gtgttgtcct tggacgcggt cacaaacatg ggcatgtccc 360
tggataactg gatgtccgtg atctgcccgg agtgcttctt aacattncca acacctnttc 420
aaanttggca ctatactggg tgagctcttc acttttatng gcaacgnatg atcacttccc 480
caagggtccc caaacagcac tggggaattt agagncattc cagggaactt tatgtagggt 540
tcatggtgca attggttnga tccccaggtc aaaaagttnc aaacactgga nccctttctt 600
gtccnnggag aacatgttat ttgccccaag taaaacccng nccggng 647

<210> 324
<211> 653
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(653)
<223> n = A,T,C or G

<400> 324
ggtacttttt tttttttttt tttttttttt ttgagatgga gtcttgctct gttgccagac 60
cggagtgcag tggtgcgatc tgggctcact gcaatctcca cctcccgggt tcaagcgatt 120
ctcctgcctc agcctcccga gtaactggga ctacaggtgt gcgccaccaa gcccagctca 180
tttttgtatt tttagtanag atggggtttc acgatgttgg ctaggatggt ctcgatctct 240
ggtcagagtc ttttctgtaa aaatccttgg taaagaagca attttagact gtancctgtt 300
gcaaatgcnt taaggaagaa gcaaaacaac tgntagtctt tctgaaatga aaaaactacn 360
ccagggctgg tatatnnaga gcaaccccaa ccannactnc catcntgatg cccacagggg 420
cccactgana nacccngaaa angtccnnaa gcntaaannt ngangcnttg cttttgaaat 480
attgcgccng taccnagntn nagacaaacn ngnttaaggc ccnnantntt tggccngant 540
ttgcgataaa aaaaacttgg gggtcgctnc nngatcccnn ttgtnccccca naanctgggg 600
ggatgggttn aagcccntgn cnnaaggttt nngttctccc aaggtaaaan nng 653

<210> 325
<211> 655
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(655)
<223> n = A,T,C or G

<400> 325
ggtacgcggg gcctttggc tctctgacca gcaccatggc ggttggcaag aacaagcgcc 60
ttacgaaagg cggcaaaaag ggagccaaga agaaagtggt tgatccattt tctaagaaag 120
attggtatga tgtgaaagca cctgctatgt tcaatataag aaatattgga aagacgctcg 180
tcaccaggac ccaaggaacc aaaattgcat ctgatggtct caaggggtcg tgtgtttgaa 240
agtgagtctt gctgatttgc agaatgatga agttgcattt agaaaattca agctgattac 300
tgaagatgtt caagggtaaa aactgnctga ctaacttcca tggcatggat cttacccgtg 360
acaaaatgtg gtccatgggc aaaaaatggc agaccatgat tgaagcttac ggtgatgtca 420
agactaccga atgggtactt gcttcgtctg gtctggggtg ggtttactaa aaaacgcaca 480
atnanatacc gaagaactct tatgcttang accacangtc cngccaatcc ggagaanata 540
tggaaatctg accccaaagn gccnaccaat gacttgaaaa annggccatt aaatggttcn 600
nacacnttgg aaaagcctta aaaggttgcc aantattaac ctntcatgaa gnttc 655

<210> 326
<211> 657
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(657)
<223> n = A,T,C or G

<400> 326
ggtacgcggg ggaaacggga gtgaacggag agcgtagtga ccatcatgag cctcctcaac 60
aagcccaaga gtgagatgac cccagaggag ctgcagaagc gagaggagga ggaatttaac 120
accggtccac tctctgtgct cacacagtca gtcaagaaca atacccaagt gctcatcaac 180
tgccgcaaca ataagaaact cctgggccgc gtgaaggcct tcgataggca ctgcaacatg 240
gtgctggaga acgtgaagga gatgtggact gaggtacttt tttttttttt ttnttctttt 300
ttttgagata gggnctcact gnatnaccca ntntggaatg caattggcat gaacncagct 360
tactgnagnc ttccaaacct gggctcaagc aattatnttg nattaacctn ttgagtacct 420
gggactntcn cangcaccan ccctgctttg cttacttaaa tttttgtnaa nacnnggctt 480
gctttttttc ccaggntggn tcnaactccn gaattaaggg atccttcccc ctcaattttt 540
aaannngctg ngattntnga atangccttt ttgttngccc ttttnacctt ttnnnnggtt 600
nnttcnnggc tttaanoctn ccgggggccn tttaaaggng aaatcncncc ttgggg 657

<210> 327
<211> 658
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(658)
<223> n = A,T,C or G

<400> 327
ggtacttttt tttttttttt tttttttttt tttttttttgg tttgaaacag aaatttattc 60
tcanaataat gcacagaagc acaggttgag gctactcttg ggaagcttcc ctccccttcc 120
tcttcctcct ctccctcctc tctgaatgcc agggagaaca cagttgaagg aaggaaacat 180
gcaatcacaa acaatgaaca actntaaaga caaaaaggtt tggtccaaaa gaactcaaca 240
taattaatcc aatgactgtg aanagcttca ctgagtagga ttaanatatt gcagatgtan 300
ngtttncaca gggtggctnt tcagtgcacc ancggggcct ncttgangga natgaggact 360

gacncatncg ggaaanatct ttggcctgct tgctaaactt ggggntaaag gcacacnnnc 420
cgggccaccc gttccactna nngcctgggg accanttgtc aatgncnttt ccnaangntt 480
tttttgntgc cttgtggttg nttttggttt ctggaactgn tcgncctgnc ttgnaaacca 540
ttnttntaac nccttaatgg cctttctttt cnnnctggtt ntgnttccaa aatnggatta 600
ngggttcang ngcccctact tnccgggggc ngttaaangg naattccncc nctggngg 658

<210> 328
<211> 644
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(644)
<223> n = A,T,C or G

<400> 328
acgcggacgg tggtttttgg gcccgtttct gagcagcgct tcctttttgt ccgacatctt 60
gacgaggctg cggtgtctgc tgctattctc cgagcttcgc aatgccgcct aaggacgaca 120
agaagaagaa ggacgctgga aagtcggcca agaaagacaa agacccagtg aacaaatccg 180
ggggcaaggc caaaaagaag aagtggtcca aaggcaaagt tcgggacaag ctcaataact 240
tagtcttgnt tgacaaagct acctatgata aactctgtaa ggaagttccc aactataaac 300
ttataacccc agctgtggnc tcttgagaga ctgaagattc naggctncct ggccagggca 360
gcccttagg agcttcttag taaaggactt atnaactggt tttnaancac agacctcaag 420
taattnacac cagaaatncc nnggtggaga atnctccnct gctggtnnag angcatgaat 480
aggnncaacc agctntctct gnccnnaccn cncttaggnc naattccgca ccctgcggcc 540
gttctnatgg atccnaactn ggtnccaant nggcnnacta tggcatancn tgccctgggg 600
aantggttcc nttccaatcc anaanttcta tcgnaactta acgg 644

<210> 329
<211> 651
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(651)
<223> n = A,T,C or G

<400> 329
actattagcc atggtcaacc ccaccgtgtt cttcgacatt gccgtcgacg gcgagccctt 60
gggccgcgtc tcctttgagc tgtttgcaga caaggtccca aagacagcag aaaattttcg 120
tgctctgagc actggagaga aaggatttgg ttataagggt tcctgctttc acagaattat 180
tccagggttt atgtgtcagg gtggtgactt cacacgccat aatggcactg gtggcaagtc 240
catctatggg gagaaatttg aagatgagaa cttcatccta aagcatacgg gtcctggcat 300
cttgtccatg gcaaatgctg gacccaacac aaatggttcc cagtttttca tctgcactgc 360
caagactgag tggttggatg gcaagcatgt ggtgtttggc aaagtgaaaa gaaagggcat 420
gaatattgtg gaggccatgg aaccgctttg ggtccaggaa tgncnagaac agcaagaaga 480
acaccattgc tgactgngga caactcgaat aagttggact tggggttant ttaaccacca 540
gaacaattcc tttgtncnta aggagancan ccctcaccca tttgntngca tatcctanaa 600
actttgggct ttcnttngtt cctttggttc aggtttcctg gtcctccanc c 651

<210> 330

<211> 643
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(643)
<223> n = A,T,C or G

<400> 330
actttntttt ttttntnttt tttttttttt ctggaaggnt ctcaggtctt tatttgctnt 60
ctcaaattcc aggaatngac ttatttaatt aatccatcaa cctctcatag caaatatttg 120
agaaaacaaa tttatattca gattcttatt ttcagtaggg aagtaagaag ttgcagctca 180
ttgcacgtaa agttgagaca ganatggaga catccagccc cacctntctg gaacaagaaa 240
gatgactggg gaggaaacac aggtcancat gggaacaggg gttacagtgg acacaagggn 300
gggctgnctn ttcacctnct tacattatgc taacagggac ncaaacccat tcaggggcct 360
ttgcnaaaag aaatgccaaa agctnttgaa gtcncnaagg ggangcgtga anaaaactgc 420
atttnagtcc ccgggtcctt ngncgggaac ccctnanggn gaaatcncca cactggcggg 480
ccgtactagn ggatccagct nggncccaat tggnggaata tggnnaanac tgttcctgtg 540
ggaaaatggn atccgtccaa ttcnccactt acanncggag cctaaangna aaacntgggg 600
ngcctatggg gggctacnnn aataatgggt gcctacggcc cnt 643

<210> 331
<211> 652
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(652)
<223> n = A,T,C or G

<400> 331
ggtacagatg gcactgacaa tccccttttct ggtggggatc agtatcagaa catcacagtg 60
cacagacatc tgatgctacc agattttgat ttgctggagg acactgaaag caaaatccaa 120
ccaggttctc aacaggctga cttcctggat gcactaatcg tgagcatgga tgtgattcaa 180
catgaaacaa taggaaagaa gtttgagaag aggcatattg aaatattcac tgacctcagc 240
agcccgattc agcaaaagtc agctggatat tataattcat agcttgaaga aatgtgacat 300
ctccctgcaa ttcttcttgc ctttctcact tggcaaggaa gaaggaagtg gggacagang 360
agatggccct ttcgcttang tggccatggg ccttnctttt cactaaaagg aattaccgaa 420
cagcanaaag aaagncttga gatagtgaaa atggggatga tatctttaga agggngaaga 480
tggggtggat gaaattattc attcctgnga agnttgnaaa ctgngcgnct tcnnnaaant 540
nnnaggcatt ccntnnctgg ccntgccatt gccattggnt ccanttgcta tagggatgcc 600
ccttaaancn ntttccnnna anagtnnaaa acttgcnntn ggatccaacc nn 652

<210> 332
<211> 648
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(648)

<223> n = A,T,C or G

<400> 332
cgaggtactt ttttttttt ttttttttt tttttttgag acagagtttc actcttgtcg 60
cccaggctgg agtgcagtgg cgcgatctcg gtccactgca acctcaccct cccaggatca 120
agcgattctc ctgcctcagc cacctgagta gctgggatta caggcgcctg ccactacacc 180
tagccaattt ttgtattttt agaagggaca gcatttcacc atgttggcca ggctggtctc 240
gaactcctga tctcaggnga tccacccacc tcagcctccc aaagtggngg gattacaggc 300
gtgagccact gaaagttctc attagttttt tggttaaatt ttaaacataa attatgttat 360
agcaaaaatt cctaagaatt gnaaaccact ttatcagaaa tatcnnaaat tcacaaataa 420
tnccaaaatt tataatagct tttttccaga ctaaaatttt aaagctactg anaagnggna 480
aacctnccta natagattt acctaacatt nnggantaaa aggnanccan ngcctgctaa 540
anatccagan tatctaanaa tccntncctg nntctcnntc tatnttttca natccgaatt 600
tttgaaccca cnttangata nctnntttcc cccttaacnn taattccc 648

<210> 333
<211> 656
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(656)
<223> n = A,T,C or G

<400> 333
cgaggtacaa gatgtccaaa tattgcgaag atctatttgg ggatctcctg ttgaaacaag 60
cacttgaatc acatccactt gaaccaggca gggctttgcc atccccccaat gacctcaaaa 120
gaaaaatact cataaaaaac aagcggctga aacctgaagt tgaaaaaaac agctggaagc 180
tttgagaagc atgatggaag ctggagaatc tgcctcccca gcaaacatct tagaggacga 240
taatgaagag gagatcgaaa gtgctgacca agaggaggaa gctcaccccg aattcaaatt 300
tggaaatgaa ctttctgctg atgacttggg tcacaaggaa gctgttgcaa atagcgtcaa 360
gaaggcttca gatgaccttg aacatgaaaa caacaaaaag ggcctggtca ctgtagaaga 420
tgagcangcg tggatggcat cttataaata tgtaggtgct ccactaatat ccatncatat 480
ttgtcaccat gatcaactac cccagnctgt naaggttcaa ggtttcatgt ggcanaagaa 540
ccccatattc ttttacatgg cttctttaat gaatcatcgg cttggtactg aaaccctgcc 600
attgaattgc attntacaac ggcaatgagc natttcccca gggaggccng cnttct 656

<210> 334
<211> 647
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(647)
<223> n = A,T,C or G

<400> 334
acgcgggcgg gaagtgcaga ggcaaatgca tttagtgttc ttcagcatgt cctcggtgct 60
gggccacatg tcaagagggg cagcaacacc gccagccatc tgcactaggc tgttgccaag 120
gcaactcagc agccatttga tgtttctgca tttaatgcca gttactcaga ttctggactc 180
tttgggattt atactatctc ccaggccaca gctgctggag atgttatcaa ggctgcctat 240

```
aatcaagtaa aaacaatagc tcaaggaaac ctttccaaca cagatgtcaa gctgccaaga 300
acaagctgaa agctggatac ctaatgtcaa tggagtcttc tgagtgnttc ctggaagaaa 360
gtcgggtccc aagctctaag tgctggntct tacatgccac cattcacaag tctttaacag 420
aatgattcan tggctaatgc tgatatcata aatgcgnaaa naaagtttgg ttctggcnag 480
aagtcaatgg cancaagtgg naaatttggg acatacncnt ttgtgataag tggaatactg 540
gngcncnctt acngganana cttaacgttn tttaanccaa acacaaccct tgaaagnnna 600
agctctaaan accattggct tttttcnggg ngnaaaaaag gcttaag 647
```

<210> 335
<211> 657
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(657)
<223> n = A,T,C or G

<400> 335

```
acaggtcaga gtcttctttt cttttctttt tgagatggag tcttgctctg ttgccagact 60
ggagtgcagt ggtgcgatct gggctcactg caatctccac ctcccgggtt caagcgattc 120
tcctgcctca gcctcccgag taactgggac tacaggtgcg cgccaccaag cccagctcat 180
ttttgtattt ttagtagaga tggggtttca cgatgttggc taggatggtc tcgatctctg 240
gtcagagtct tttctgtaaa tatccttggt aaagaagcaa ttttagactg tagctgttgc 300
aaatgcttta aggaagaagc aaaacaactg tcaagtcttc ctgaaatgaa gaaactacac 360
cagggctgct atatcagagc aaccccaacc agcacttcaa tcatgatgcc nacagtggcc 420
cagctgagag accnggagaa agttccagat gcanagactg ngatgctctt gactatggaa 480
atattgcggc cagtaccaag ttagagacca aacaggcata ngnncccgta ttaattggcg 540
tgaattttgc gataaganaa cttggggggg tgctgcggat nccatgatcn ccagaaaact 600
tnngggatgg ggtanaggcc catggcagaa aggttanggt ccttccaaag naaaana 657
```

<210> 336
<211> 649
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(649)
<223> n = A,T,C or G

<400> 336

```
ggtacgcggg caactatgga attccacagc gtgctctgcg gggtcactcc cactttgtta 60
gtgatgtggt tatctcctca gatggccagt ttgccctctc aggctcctgg gatggaaccc 120
tgcgcctctg ggatctcaca acgggcacca ccacgaggcg atttgtgggc cataccaagg 180
atgtgctgag tgtggccttc tcctctgaca accggcagat tgtctctgga tctcgagata 240
aaaccatcaa gctatggaat accctgggtg tgtgcaaata cactgtcagg atgaaaacca 300
cttaaantgg gtgncttgng nccccttntng cccaacagca acaaccctat tatcgtcttc 360
tgnggctggg acaaactggn taaaggatgg aacctggcta actgnaagct gaaaaacaac 420
cacattgggc acacangcta tntgaacacc gngactggct ttttcagang gatcctntgn 480
gcttntggag gcaaggatgg gcaagccatg ttatnggaac tcnaccaang caacaccttt 540
cacctttaan gggggacat tatnaacgcc ttgggttaac cttaacgttn ttggtttgng 600
ctgcncaggc ccacattaaa aatgggattt aanggaaana catttnann 649
```

<210> 337
<211> 652
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(652)
<223> n = A,T,C or G

<400> 337
```
actcttggtt tgtcaatggg actttccagc aatccaccca agagctcttt atccccaaca     60
tcactgtgaa taatagtgga tcctatacgt gccaagccca taactcagac actggcctca    120
ataggaccac agtcacgacg atcacagtct atgcagagcc acccaaaccc ttcatcacca    180
gcaacaactc caaccccgtg gaggatgagg atgctgtagc cttaacctgt gaacctgaga    240
ttcagaacac aacctacctg tggtgggtaa ataatcaaga gccttccggt cagtcccagg    300
ctgcagctgt caatgacaca ggaccctnac tctactcagt gtcacaagga atgatgnaag    360
gaccctatga atgtggaatc cagaacgaat taaagcgttg accacagcga ccangcatcc    420
tgaatgcctt tttgggccan acgaccccac cattttcccc tcataccact attaccgtcc    480
aggggtgnac cttagncttt tcttgccatg cagcctttac ccaccttgac agnattcctg    540
gctggatgtt gggaacatna gnacncacnc aagagctntt ttttccaaca tnatgggaaa    600
acanngnnct tatactgcag gccattactt ngccntngcc cagnnggctn cg            652
```

<210> 338
<211> 651
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(651)
<223> n = A,T,C or G

<400> 338
```
ggtacatttg aacacacggc tgtgttaaag atgctgctaa tgtcagtcac tgggtgcact     60
aaaggatctc ttattttatg taaaacgttg ggattgacaa gatagatctg acactctgtt    120
aagttaccct ctgaagctac ttcttgtgaa atactaatga cagcatcatc ctgccaagcg    180
aaagaggcag gcataagcaa ggacaaatta aaagggggta agagccttat catgatgagg    240
agtcttgntt tgacatcttg ggaaaagctg ccatagtgtg aaagtcgtca atttctcacc    300
atggtttgca gtttgactgn ctctagttag ggtgaagtct ctgagtggca cacaccttaa    360
gcctgaaggn tttccctta aattttcatt gagttggccc tcttcagcat atanggcttt    420
aagaacagaa canaccttgg ttttaagtgg gtccatggga taaaatggga atggangact    480
ngaagaattc aagggctggg ccatctngca gtattctgaa tatcgaaaat ncnccaaggc    540
tgctatataa ancccccctgg gcaanacttc aatcggaanc ccacggnggc ccnactnana    600
gncaggaccn ttccaantgg aacatnggan tggggccttt gaggcnnggn n             651
```

<210> 339
<211> 634
<212> DNA
<213> Homo sapiens

<220>

<221> misc_feature
<222> (1)...(634)
<223> n = A,T,C or G

<400> 339
```
actttttttt tttttttttt ttttttctag tttcagttat ttattgattt aatcattgta      60
atctccaata gagattacaa tagagatctc caacatgatt tcatgcattt agaggagaaa     120
tatttcctgg ttaagtggaa aattgtgcgg atgtggcttc tggaanacct tcattctaaa     180
gcagcgttat agtgaaacat ttcatttana aatctggacg ttccttcttc agcttgctgt     240
aatccacatt cactgagtag aacttgtatt gatcattggg acccagtttg ttccagggct     300
ctgggttatt tctgcccaac aaacatctgg attgaacaat gccagacgca agagatcagt     360
gttgctccag tagctccagt tccaataaat acnaagaggg ggatcaaagc tcggatgctt     420
cttggcctga ccgatgatct ggcgggancat gtttgcngca aagtctccga ctggaaagga    480
ganaaccgcc taccccaagc cctaagctaa aaattatntg ccccgcgacc ttggncgnga     540
cccnctaagg caattccacc actggcggcc gtctaangga tccacttggg ccaacttgng     600
naacatggca nactggtcct ggggaangta tccc                                 634
```

<210> 340
<211> 655
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(655)
<223> n = A,T,C or G

<400> 340
```
ggtactcttc cactcaggta tccgtgcggc cactccagca cacgcagtat gagcgcttca      60
tcccctcggc ctacccctac tacgccagcg ccttctccat gatgctgggg ctcttcatct     120
tcagcatcgt cttcttgcac atgaaggaga aggagaagtc cgactgaggg gctagagccc     180
tctccgcaca gcgtggagac ggggcaggga ggggggttat taggattggt ggttttgttt     240
tgctttgttt aaagccgtgg gaaaatggca caactttacc tctgtgggag atgcaacact     300
gagagccaag ggtgggagt tgagataatt tttatataaa agaagttttt ccactttgaa     360
ttgctaaaag tggnattttt cctatgtgca gtcactcctc tcatttctaa aatagggacg     420
tggccaggca ccgtggctca tgcctgtaat ccacactttt ggaggncnng caagcggtta     480
cgaagtcagg agatcgagac tattctggtt acacgnaaaa cctgncttac taaaagtacc     540
tgcccggccg gccgntcaaa ggcgaatcca cacactggcg ggcgtactan tggatnccaa     600
cttggaccaa cttggngnaa tatggcatac tggttcctgg nggaaatggt accnn          655
```

<210> 341
<211> 648
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(648)
<223> n = A,T,C or G

<400> 341
```
acgaacctac agttttaact gtggatattg ttacgtagcc taaggctcct gttttgcaca      60
gccaaattta aaactgttgg aatggatttt tctttaactg ccgtaattta actttctggg     120
```

ttgcctttgt ttttggcgtg gctgacttac atcatgtgtt ggggaagggc ctgcccagtt 180
gcactcaggt gacatcctcc agatagtgta gctgaggagg cacctacact cacctgcact 240
aacagagtgg ccgtcctaac ctcgggcctg ctgcgcagac gtccatcacg ttagctgtcc 300
cacatcacaa gactatgcca ttggggtaag ttgtgtttca acggaaagtg ctgtcttaaa 360
ctaaatgtgc aatagaaggn gatggtgcca tcctaccgnc ttttcctggt tcctanctgn 420
gtgaatacct gctacgtcaa atgcntacca ggttcattct ncctttnact aaaacacaca 480
ggtgcaacag acttgaatgc taagtatacc taattggata tgggatttaa ttttctttct 540
tacaancatt tgtattgcta acaggccaaa atttcagtta cccttagggt ggttaacaat 600
cnaattaaac ctgggaggca tacnttgnct aaatattact gnaaaaaa 648

<210> 342
<211> 342
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(342)
<223> n = A,T,C or G

<400> 342
ggtacttttt tttttttttt tttttttttt gttttttttt tttttttttt tttttttttt 60
tggctntana gggggtanag ggggtgctat agggtaaata cgggccctat ttcaaanatt 120
tttaggggaa ttaattctag gacnatgggc atgaaactgn ggtttgctcc acanatttca 180
nagcattgac cgtagtatac ccccggtcgt gtancggtga aagtggtttg gtttaaacgt 240
ccgggaattg catctgtttt taagcctaat gtggggacag ctnatgagtg caaaacgtct 300
tgngatgtaa ttattatacc aatgggggct ttaatcggga at 342

<210> 343
<211> 484
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(484)
<223> n = A,T,C or G

<400> 343
ggtacgatgc ctagtgatga gtttgctaat acaatgccag tcaggccacc tacggtgaaa 60
agaaagatga atcctagggc tcagagcact gcagcagatc atttcatatt gcttccgtgg 120
agtgtggcga gtcagctaaa tactttgacg ccggtgggga tagcgatgat tatggtagcg 180
gaggtgaaat atgctcgtgt gtctacgtct attcctactg taaatatatg gtgtgctcac 240
acgataaacc ctaggaagcc aattgatatc atagctcaga ccatacctat gtatccaaat 300
ggttcttttt ttccggagta gtaagttaca atatgggaga ttattccgaa cctggtagga 360
taagaatata aacttcaggg tgaccgaaaa atcagaatan gtgttggtat agaatggggt 420
cttcttcttc ngcggggtcn aanaaggtgg tggtnccgcg tcctggccng gcnggcgctc 480
gaan 484

<210> 344
<211> 657
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(657)
<223> n = A,T,C or G

<400> 344
cgaggtacgc gggattgttc tggggcttgt cctcctttct gttacggtcc agggcaaggt 60
ctttgaaagg tgtgagttgg ccagaactct gaaaagattg ggaatggatg gctacagggg 120
aatcagccta gcaaactgga tgtgtttggc caaatgggag agtggttaca acacacgagc 180
tacaaactac aatgctggag acagaagcac tgattatggg atatttcaga tcaatagccg 240
ctactggtgt aatgatggca aaaccccagg agcagttaat gcctgtcatt tatcctgcag 300
tgctttgctg caagataaca tcgctgatgc tgtagcttgt gcaaaaangg ttgtcccgtg 360
atccacaagg cattaagagc atgggtggca tggagaaatc gttgtcaaaa cagagatgtc 420
cgcagtatgt tcaanggtgt ggagtgtaac tncagaattt tccntcttca ctcatttggc 480
tctctacatt aaggagtagg aaataantga aaggtcccct ccattaattt cccttcaaca 540
aataattttt tccgaaacng gaccaaatat ggccttcttn tagannataa tgtcntaagg 600
ggnatttatt ttaagcnnca cantttaat ttgcaaatna ctatctgggg aaaatac 657

<210> 345
<211> 662
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(662)
<223> n = A,T,C or G

<400> 345
ggtacgcggg cgactcttag cggtggatca ctcggctcgt gcgtcgatga agaacgcagc 60
tagctgcgag aattaatgtg aattgcagga cacattgatc atcgacactt cgaacgcact 120
tgcngccccg ggttcctccc ggggctacgc ctgtctgagc gtctcttgca aaaaaaaaat 180
aaannanaan acancaagta caatttaatg cntanaaagg cctctctcca taaaactcan 240
cnctttacag atgtangaat atataagcnn tgccaaaatt actaatntgc cacatacnna 300
gcatcaattc caggtgctag tnagngggaa aaaaanttgg agaattcggc cctcgangag 360
ctccanannt taanctncct tactaantnc canggttctt tcaagcatgg aaaaattaat 420
ngtgctncat ngatnaangn cttgtcattg ggccttnttt cctngacctg gcccggccgn 480
ccgttcnaaa ggctaaatcc agacactgcg gccgttntaa tggttcnnac ttgggccaag 540
cttgggnaat catgggcaaa gctgttcctg ggnnaaatnt tatccnctcc aattcncaca 600
natacgaanc tgaancttaa gtgtnanntn gggngctaaa agtggcnaan ctcccttnat 660
gg 662

<210> 346
<211> 654
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(654)
<223> n = A,T,C or G

<400> 346
acttcttggc cgcctcacta gcactctccg cctgcttttt aaaggcttca ttggaggcca 60
gcagcgtggc ctgctgcgaa atgagagtca ccaggcgtct aagcaggaag gacagcagcg 120
aggaaaagcc agcaatgtag agattcctct gggcacggaa aagcttcatg tggaagtgct 180
ccatggcccc gggattgttc tggaggttca ccttttccgt cacatcatca tacttccgaa 240
tttcgcgcac ggcatcgatg accaacagca caaggatgac aatgagaacc acaaagaagg 300
tgttgccata ggacactaac aactccacca gccgggactt gaaaatcttc tgccatcttt 360
taggagaaat gaagggaatg cagagaagca acacaacaaa gaccttcgca tagaggaagg 420
tggcaactgc agtccactgc agactcatcc tggtgctana agggttccac aggaagatgt 480
gaacttgttn cgagtttcca cagtcaacgt gtcccccgta ccttnggccg ngaacacnct 540
taaggcgaat tccaccactg cnggccgtct antggatcca actnggncca acttggcgaa 600
tatggcaaat tgttctnggg naaatggttc ngtcaattcc ccantacnac cgga 654

<210> 347
<211> 536
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(536)
<223> n = A,T,C or G

<400> 347
ggtactaatt taaggtaaca attctcgagg taaaataagg cattatagta acacaatttt 60
catgcctcag caattaacaa tgattttcgt ttaattctct tccaactcta cagacataat 120
tctgctttca ccttcatcac gctttcatat ggttttaaca ggggatacac ctcctcttct 180
aagaatctct gcacctgctg ggaggcacga ccagtgaaag aagaaggatc cagtaaatga 240
tccaactggg agtgaatggg actgaagtag gcatcaacct ggatacgctc tatgaggnca 300
ttgcaccccc ttcctgctta accacagaag ctgcctgctg agaaagcact ctgattttct 360
catggcaatc ctggcggcta ccttcacttt gaccatggcc atgatgatgg tctctgtggc 420
catgaaangc agctcttgcc gaatgcgccg tcaattactt tggggtacct gcccnggccg 480
gccgntcnaa nggcgaattt cagccactgg cngncgtact agnggatcca actcgg 536

<210> 348
<211> 665
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(665)
<223> n = A,T,C or G

<400> 348
ggtacgcggg gagtcggcgt aggccttagg tgggttcgtg cgccttctac ctcgctgttt 60
cggttttcct ggctcctcgg cccttttctc ccctgttgca gctgggagcg gacgaagcgc 120
gaagctggga ttttttactg tctcctgaag aatttaacac aaacatggat atcagaccaa 180
atcatacaat ttatatcaac aatatgaatg acaaaattaa aaaggaagaa ttgaagagat 240
ccctatatgc cctgttttct cagtttggtc atgtggtgga cattgtggct ttaaagacca 300
tgaagatgag gggcaggcc tttgtcatat ttaaggaact gggctcatcc acaaatgcct 360
tgagacagct accaggattt ccattttatg gtaaaccaat gccaatacag tatgcaaaaa 420
cagattcgga tataatatca aaaatgcgtg gaacttttgc ttaaaaaaaa aaannnnnna 480

naaaaaagtc ctgccnggcc gcccgttcaa anggcgaatt naccactggc ggccgttcta 540
gnggatccaa ctnggnacca acttggcgta atatggcaaa actggtnccg ngngaaatgg 600
tatccgttan aattcccaca cttcaaccgg aacctnaang taaacctggg gcctaagagn 660
gacnn 665

<210> 349
<211> 474
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(474)
<223> n = A,T,C or G

<400> 349
acttcgtcag tttgtaagac atgagtccga aacaactacc agtttggttc ttgaaagatc 60
cctgaatcgt gtgcacttac ttgggcgagt gggtcaggac cctgtcttga gacaggtgga 120
aggaaaaaat ccagtcacaa tattttctct agcaactaat gagatgtggc gatcagggga 180
tagtgaagtt taccaactgg gtgatgtcag tcaaaagaca acatggcaca gaatatcagt 240
attccggcca ggcctnagag acgtggcata tcaatatgtg aaaaaggggt ctcgaattta 300
tttggaaggg aaaatagact atggtgaata catggataaa aataatgtga ggcgacaagc 360
ncaaccatca tagcttgatn atattatatt tctgagtgcc agaccaaaga gaaggagtnt 420
aaanggatga tcntcttttg ggcatcattt tgggaccttn ggccgggaac accc 474

<210> 350
<211> 452
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(452)
<223> n = A,T,C or G

<400> 350
acgcggggac cgtggagagc agagcgcggc ggctggaagc tgctaagtca gagccgcgat 60
gttccggatt gagggcctcg cgccgaagct ggacccggag gagatgaaac ggaagatgcg 120
cgaggatgtg atctcctcca tacggaactt tctcatctac gtggccctcc tgcgagtcac 180
tccatttatc ttaaagaaat tggacagcat atgaagacag gacatcacat atgaatgcac 240
gatatgaaga gcctggttac agtttcgact cctctctgca agtgaatagg cccagaaagg 300
tgtaagagac tctttgaatg gacataaaat tctgcttgtt aagaacaagt ttggctctgg 360
taactgacct tcaaagctaa aatataaaac tatttgggaa agtatgaaac gatgtcttcg 420
tgatctggtg taccttggnc gngaccacgc tt 452

<210> 351
<211> 616
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(616)

<223> n = A,T,C or G

<400> 351
ggtacgcggg aataattcca tagtcaagag catcacagtc tctgcatctg gaacttctcc 60
tggtctctca gctggggcca ctgtcggcat catgattgga gtgctggttg gggttgctct 120
gatatagcag ccctggtgta gtttcttcat ttcaggaaga ctgacagttg ttttgcttct 180
tccttaaagc atttgcaaca gctacagtct aaaattgctt ctttaccaag gatatttaca 240
gaaaagactc tgaccagaga tcgagaccat cctagccaac atcgtgaaac cccatctcta 300
ctaaaaatac aaaaatgagc tgggcttggt ggcgcgcacc tgtagtccca gttactnggg 360
aggctgaggc aggagaatng cttgaacccg gnaggtggag attgcagtga gccagatcgn 420
acnactgnac tcagtctggc aantgagnag gcttccatct nanaangaan aganangang 480
actntnacct ggacctgccn ggccggtcgt ttgngcaggt cnggagattt attcccttng 540
ggtggggngc nntaattggn tgntgggccn attcangttt tgggaatttc nncttggnnn 600
naaaanggga aatttt 616

<210> 352
<211> 603
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(603)
<223> n = A,T,C or G

<400> 352
ggtacggcac ttggcgtaaa gccgcttccc tcaagagtaa ctacaatctt cccatgcaca 60
agatgattaa tacagatctt agcagaatct tgaaaagccc agagatccaa agagcccttc 120
gagcaccacg caagaagatc catcgcagag tcctaaagaa gaacccactg aaaaacttga 180
gaatcatgtt gaagctaaac ccatatgcaa agaccatgcg ccggaacacc attcttcgcc 240
aggccaggaa tcacaagctc cgggtggata aggcagctgc tgcagcagcg gcactacaag 300
ccaaatcaga tgagaaggcg gcggttgcag gcaagaagcc tgtggtaggt aagaaaggaa 360
agaaggctgc tgttggtgtt aagaagcaga agaagcctct ggtgggaaaa aaggcagcag 420
ctaccaagaa aaccagcccc tgaaaagaac ctgcagagaa gaaacctact acngaggaga 480
agaagcctgc tgcataactc ttaaatttga atatttcntt aagggcnaat nttttggcag 540
gttctttgga taagacntnt tttcngngtg ggaaaataan tnnnntattn nnggctntcc 600
tgg 603

<210> 353
<211> 604
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(604)
<223> n = A,T,C or G

<400> 353
ggtaccgact gtttttgaca actatgcagt cacagttatg attggtggag aaccatatac 60
tcttggactt tttgatactg cagggcaaga ggattatgac agattacgac cgctgagtta 120
tccacaaaca gatgtatttc tagtctgttt ttcagtggtc tctccatctt catttgaaaa 180
cgtgaaagaa aagtgggtgc ctgagataac tcaccactgt ccaaagactc ctttcttgct 240

tgttgggact caaattgatc tcagagatga cccctctact attgagaaac ttgccaagaa 300
caaacagaag cctatcactc cagagactgc tgaaaagctg gcccgtgacc tgaaggctgt 360
caagtatgtg gagtgttctg cacttacaca gaaaggccta aagaatgtat ttgacgaagc 420
aatattggct gccctggacc tncagaccga agaagacccc aagtgtgtgc tgctatgaac 480
atctttcaga gcctttcttg nacagctgga ttggcatctt cttaaagcca tgnttaaatt 540
caacttanga ttaaaattaa aattcgtttt gcannatggc caatgcctgg actaacccan 600
ggcn 604

<210> 354
<211> 631
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(631)
<223> n = A,T,C or G

<400> 354
ggtacttttt tttttttttt tttttttttt tttgggacgg agtcatgctc tgtcgcccag 60
gctggagtgc agtggcatga tctcggctca ctgcaagctc cgcctcccgg gctcatgcca 120
ttctcctgcc tcagcctccc gagtagctga gattataggc acctaccacc acgcccggct 180
aatttttgta tttttagtag agacggggtt tcaccatgtt gaccaggctg gtctcgaact 240
cctgacctta ggtgatccac tcgccttcat ctcccaaagt gctgggatta caggcgtgag 300
ccaccgtgcc tggccacgcc caactaattt ttgnattttt agtaagagac agggtttcac 360
catgttggcc aaggctgctc tttgaactcc tgacctcatg taatcgacct gcctttggcc 420
ttccaaaagt gctgggatta ccaggtgtga gcccacaagc cccggnacct ggccnggcng 480
gccgtttaaa agggcgaatt cagcacaatg gnnggccgta ctaaggggat ncnanctttg 540
nanccaactt tgggggaaat atggggcana actggttcct ngngnaaatg gtaaccgtta 600
caaattcccn caaanttttg nnccgggagg n 631

<210> 355
<211> 626
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(626)
<223> n = A,T,C or G

<400> 355
ggtacgatgc ctagtgatga gtttgctaat acaatgccag tcaggccacc tacggtgaaa 60
agaaagatga atcctagggc tcagagcact gcagcagatc atttcatatt gcttccgtgg 120
agtgtggcga gtcagctaaa tactttgacg ccggtgggga tagcgatgat tatggtagcg 180
gaggtgaaat atgctcgtgt gtctacgtct attcctactg taaatatatg gtgtgctcac 240
acgataaacc ctaggaagcc aattgatatc atagctcaga ccatacctat gtatccaaat 300
ggttcttttt ttccggagta gtaagttaca atatgggaga ttattccgaa gcctggtagg 360
ataagaatat aaacttcagg gtgaccngaa aaatcagaat aggtgtttgg tttagaatgg 420
ngtcttctnc ttcngctggg gtnnaagaan gtnggggttc nngcgtnctn gntcgggcgg 480
ntggttttaa nggccnaaat tcnngnataa ttggcggcng ttactaagng gnatctanct 540
tggtnccaaa nttggngnta atcatggtnc tagctngtnc tcngtgntaa attggntncc 600
tgttaaattn tntnnaatnt tntggc 626

<210> 356
<211> 617
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(617)
<223> n = A,T,C or G

<400> 356
```
actttttttt tttttttttt ttttttcta gtttcagtta tttattgatt taatcattgt 60
aatctccaat agagattaca atagagatct ccaacatgat ttcatgcatt tagaggagaa 120
atatttcctg gttaagtgga aaattgtgcg gatgtggctt ctggaanacc ttcattctaa 180
agcagcgtta tagtgaaaca tttcatttan aaatctggac gttccttctt cagcttgctg 240
taatccacat tcactgagta naacttgtat tgatcattgg gacccagttt gttccagggc 300
tctgggttat ttctgtccca acaaacatct ggattgaaca atgccagacg caagagatac 360
agtgttgctc cagtagctcc agttccaata aatacnaaga gggggatcaa gctcggatgc 420
ttcttggcct gaccgatgat ctggccggaa ncatgtttgc cggcaaaagg ctccnacttg 480
ggaaagggga naacccgcct aaccnccagg gcctaagctt aaaatttttg gccccgggta 540
ccttggccgg gaccccctaa gggngnaatt ccnnccccctt ggggggccgt ttaangggan 600
ccaacttggn ccaaatt 617
```

<210> 357
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 357
```
ggtacttttt tttttttttt tttttttttt ttttaggcaa agaactttat taatctttgt 60
ttcaaacttg attcccaggc ttcttcggct taattagctg caaagaatga attgngtata 120
agcaaaaact gaaaagagct gcagtgtcca aggggcttgg gcttaaaaat attagagatc 180
tagattttat cagatccata aacaaaaatt tcttaaaaag cagtcataat ataaaatagc 240
agctcccagt aacttcttca ggntttatct tcagaagttg actcaattca gtttgcctca 300
ttcttggaag cctcatcaaa attctccaca agatctggaa cttcatcatc atcatcctct 360
ccagtaacaa gtggngcttt tccatcccca gantggttgg gcanaacttt ngnccagctc 420
cttaacttag cagactattc ggacccaagc tnggttnaaa aanctgggaa cnatttntgn 480
naactggttt ggttnaacan ggcntgnaag ggggaaaggn gtnccctgcc caaaaaaccn 540
ggacctttag ggtgnnaaag gggacctggc cctgggttgg aaccaantcn ccttttnana 600
ccnnanaatn g 611
```

<210> 358
<211> 619
<212> DNA
<213> Homo sapiens

<220>

<221> misc_feature
<222> (1)...(619)
<223> n = A,T,C or G

<400> 358
```
ggtacttttt tttttttttt tttttttttt ttgagatgga gtctcgctct gtcgcccagg      60
ctggagtgca gtggcgcaat ctctgctcac tgcaacctcc gcctcctggg ttcaagcaat     120
tctcctgtct cagcctccca aatagctggg attacgggca tgtgtcacga cgctcggcta     180
atttttgtat ttttagtcga gacgaggttc caccatgttg gctaggctgg tctcaaactc     240
ctgacctcag gtgatccgcc tgcctcggcc tcccaaagtg ttaggattac gggtgtgagc     300
cactgcgccc agcaagcaac ctagatttta aaacaacatg agataaataa gcctaattgg     360
atttaactac atctaacatt tttactaata gttgnaatac tggtagaatt tggaaactat     420
tatatatatt atgcngaaaa gtaaataatt ctggtaaaat canttanggn ccntgaattt     480
nagcataggg gaaaaaaaga tgccntttta aatccaataa gtaaaaaccn tttaaccctn     540
tntttaaatt ggaanttccc cccaatttnt tattaatttc aacttntttt gaaaactcat     600
ntttccnaaa antnggggg                                                  619
```

<210> 359
<211> 624
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(624)
<223> n = A,T,C or G

<400> 359
```
ggactttttt tttttttttt tttttttttt ttttttggag gaaaacccgg taatgatgtc      60
ggggttgagg gataggagga gaatggggga taggtgtatg aacatgaggg tgctttctcg     120
tgtgaatgag ggttttatgt tgttaatgtg gtgggtgagt gagccccatt gtgttgtggt     180
aaatatgtag agggagtata gggctgtgac tagtatgttg agtcctgtaa gtagganagt     240
gatatttgat caggagaacg tggttactag cacagagagt tctcccagta ggttaatagt     300
ggggggtaag gcgaggttag cgaggcttgt tanaagtcat caaaaagcta ttagtgggag     360
tagagtttga agtccttgag agaggattat gatgccactg ngaatgcntt cctaatttga     420
gtttgctagg cagaatagtn atgaggatgt aaacccctng gccaattatt aaaaatgact     480
gcncccgtga aacttnaggg ggtttggatt aaaaangctt gtacttccaa nggctntntg     540
gcctnattta aaaaatttcc ctnnncnaat ttagggcttn ttnncnnaag ccnanagggn     600
ccccnancct ttcccggggg ggcn                                            624
```

<210> 360
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 360
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acgcggggag gcggaggctt gggtgcgttc aagattcaac ttcacccgta acccaccgcc      60
atggccgagg aaggcattgc tgctggaggt gtaatggacg ttaatactgc tttacaagag     120
```

gttctgaaga ctgtcctcat ccacgatggc ctagcacgtg gaattcgcga agctgccaaa 180
gccttagaca agcgccaagc ccatctttgt gtgcttgcat ccaactgtga tgagcctatg 240
tatgtcaagt tggtggaggc cctttgtgct gaacaccaaa tcaacctaat taaggttgat 300
gacaacaaga aactaggaga atgggtaggc ctttgtaaaa ttgacagaga ggggaaaccc 360
cgtaaagtgg ttggttgcag ttgtgtagta attaangact atggcaagga gtctcagcca 420
aggatgtcat tgaagagtat ttcaaatgcc agaaatgaag aaattaaatc nttggcttac 480
ttaaaaaaaa annnnnnnnn aaaaaaaagg tccttgggcg gnacaccctt aaggggnaat 540
tcnnnnccct gggggccntt ataangggnn ccnacttggg ccaaattggg naaananggg 600
naaanttttt n 611

<210> 361
<211> 404
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(404)
<223> n = A,T,C or G

<400> 361
acatatttta atagaaagat acaacctttt tattttcact ccttttattt ctgctgcttg 60
gcacattttt gagttttccc acattatttg tctccatgat accactcaag cagtgtgctg 120
gacctaaaat actgacttta gttagtatcc ttggattttt agattcccag tgtctaattc 180
cctgttataa tttgcgcaaa caaaacaaaa tgttatgata atctttctcc actgttctaa 240
tatatattgt atttttattt gatagcttgg gatttaaaac atctctgttg aaggcttttg 300
atccttttga gaaataaaga tctgaaagaa atggcataat cttaaaactt gataaaaaaa 360
aaananannnn nnnaaaaaaa aaagtacctn ggccgngacc acgc 404

<210> 362
<211> 322
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(322)
<223> n = A,T,C or G

<400> 362
ggtacttttt tttttttttt tttttttttt ttttttggag ttgtaggcaa atgtttaatt 60
aattctgctc atatgcacat ctgaaagcat gagacacact ccacagacag cacgcactgg 120
ggctggtggg gcanatgggc actcgccgat taggtattaa tgtcaataat acgtgcataa 180
agtgctgata aaataactta agtgttacaa aaagagacag tccacggtgg ctgcaggcac 240
atgcaggcgg gactgggtca gacactccag ggctgcacat gttccagctg gcctgagtcc 300
gacacgtcat agctggcctt gt 322

<210> 363
<211> 616
<212> DNA
<213> Homo sapiens

<220>

<221> misc_feature
<222> (1)...(616)
<223> n = A,T,C or G

<400> 363
```
cgaggtacgc gggctaagca agggaaaaat aacagtttct ctgagccaga gaagacttga     60
tcacagttct ccaagcatcg tgatagcaat gcttaacccc aggaagattt caaggcaggg    120
agaagaacat ttcaaataag attcttgtta acccatttat gcctagtgtt ccattattgg    180
aatgctaagc ttgtgggagt catttacatc ctactgctca aagtcattgc caaggtctga    240
tttttcacac aaaaaattgc aacccccagc ataaatgttt agctactgtc atcagttagc    300
aaattcatcc acacaaacac aattagagtt tggttttttt ttaagctttt caaaacttac    360
taaactggca caattttata tgtatgctat ttggtgnatt tatgcttaag agcnaaaaag    420
tttgatggga ttttaaattc angccaagcc tacacgctga gacaatccct acaaccatgg    480
nagtaactaa ngaaccttta tctaagnttt taagttttaa anggagngct taatggttca    540
ngtctangtt ggaatttcct tcanaaattt cntcttttaa aaaattttcc caaaatnggt    600
ccttaaaaaa ctcann                                                    616
```

<210> 364
<211> 618
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(618)
<223> n = A,T,C or G

<400> 364
```
cgaggtacgc ggggcttctc gcctaacgcc gccaacatgg tgttcaggcg cttcgtggag     60
gttggccggg tggcctatgt ctcctttgga cctcatgccg gaaaattggt cgcgattgta    120
gatgttattg atcagaacag ggctttggtc gatggacctt acactcaagt gaggagacag    180
gccatgcctt tcaaatgcat gcagctcact gatttcatcc tcaagtttcc gcacagtgcc    240
caccagaagt atgtccgaca agcctggcag aaggcagaca tcaatacaaa atgggcagcc    300
acacgatggg ccaagaagat tgaagccaga gaaaggaaag ccaagatgac agatttgat     360
cgttttaaag ttatgaaggc aaagaaaatg aggaacagaa taatcaagaa tgaaagttaa    420
agaaacttca aaaggcagct nttctgaaag cttnttccca aaaaagcacc tgggtacctg    480
gccgggccgg ccgtttaaaa gggcnaattc caccactggc ggccgtctan ngggatccaa    540
cttnggacca acttggngga atatggcnaa attgttcctg gggnaaatgt ttncgttcaa    600
attncncaaa ttacggcc                                                  618
```

<210> 365
<211> 601
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(601)
<223> n = A,T,C or G

<400> 365
```
acgtcctgga ggactctatt gtggacccac agaatcagac catgactacc ttcacctgga     60
acatcaacca cgcccggctg atggtggtgg aggaacgatg tgtttactgt gtgaactctg    120
```

acaacagtgg ctggactgaa atccgccggg aagcctgggt ctcctctagc ttatttggtg 180
tctccagagc tgtccaggaa tttggtcttg cccggttcaa aagcaacgtg accaagacta 240
tgaagggttt tgaatatatc ttggctaagc tgcaaggcga ggccccttcc aaaacacttg 300
ttgagacagc caaggaagcc aaggagaagg caaaggagac ggcactggca gctacagaga 360
agccaaggac ctcgccagca aggcggccac caagaacagc agcagcagca acagtttgtg 420
taaccagnct accaacaaca nagnacccca nacaggtagg cttacccctt tggcctcctt 480
taatggacct tggccgggaa caccсttang gcgaattcag ncactggggg ccgtactang 540
ggatccnctt ggaccaactt ggggaaacag ggcaaaattg ttcttgggga aattntatcc 600
n 601

<210> 366
<211> 321
<212> DNA
<213> Homo sapiens

<400> 366
acttttttttt ttttttttt tttttttgag atggagtctc actctgtcgc ccaggctgga 60
atgcagtggt gcaatctcag ctcactgcaa cttccacctc ccaggttcaa gtgattctcc 120
tgcctcagcc tcccacatat ctgggactac aggtgcacac caccatgccc agctaatttc 180
tttgtatttt ttagtagaga cggggtttca tcttattggg caggctggtc tcgaactcct 240
aaccttgtga tctgcccacc tcggccttcc aaagtgctgg gattacaggc gtgagccacc 300
gtgctcggcc acccgcgtac c 321

<210> 367
<211> 264
<212> DNA
<213> Homo sapiens

<400> 367
actgatcatg gagttaatca acaatgtcgc caaagcccat ggtggttact ctgtgtttgc 60
tggtgttggt gagaggaccc gtgaaggcaa tgatttatac catgaaatga ttgaatctgg 120
tgttatcaac ttaaaagatg ccacctctaa ggtagcgctg gtatatggtc aaatgaatga 180
accacctggt gctcgtgccc gggtagctct gactgggctg actgtggctg aatacttcag 240
agaccaagaa ggtcaagatg tacc 264

<210> 368
<211> 488
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(488)
<223> n = A,T,C or G

<400> 368
ggtacagatg cacaggaggc catagggttt aggcanaggg gagcacaaan gttgaagatg 60
aggcgctgcc atcaatgctg ggacttcagg cnaagggcag gaactgagga agccacaagg 120
gaggacattt tctgcagttg ctgaancagt ancaactagg tcctgagaaa gccctntctc 180
gtggaagaat aacagccagg cnggaaagct tttcatcctg caaagctggg gaagaagatt 240
cttccttaaa ttgtcatctg cacttcagct cangaatcct gttggctgaa gtccagagtg 300
tccntttctg attcctgaag tanatnaaca gcccngnccc aangaagagn aggnntagta 360
caaagccnnc tncgcgtacc tgtncgggcg gnngttcgna aggntcaaat tccagcacaa 420

ttgnctgccg ttantagttg gattctnact ttngtactta ncttggcgta ntttatggtn 480
ataanttg 488

<210> 369
<211> 602
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(602)
<223> n = A,T,C or G

<400> 369
acgggggttt cactacttct cccccggact ccttggtagt ctgttagtgg gagatccttg 60
ttgccgtccc ttcgcctcct tcaccgccgc agaccccttc aagttctagt catgcgtgag 120
tgcatctcca tccacgttgg ccaggctggt gtccagattg gcaatgcctg ctgggagctc 180
tactgcctgg aacacggcat ccagcccgat ggccagatgc caagtgacaa gaccattggg 240
ggaggagatg attccttcaa caccttcttc agtgaaacgg gtgctggcaa gcatgtgccc 300
cgggcagtgt ttgtagactt ggaacccaca gtcattgatg aagttcgcac tggcacttac 360
cggcagctct tcaccctgag caactcatca caggcnagga aaaatgctgc aataactatc 420
ccgaaggcac tacaccattg gcaaggagaa taattgacct gtgttggacc gaattcgcaa 480
gctggctgac catgcaccgg cttaagggtt nttggttttc ccaacttttg ggggggggaac 540
tgggtttngg gtaaccctnn tggtnatngg aacgntttta antggatttt gggaanaaan 600
cc 602

<210> 370
<211> 257
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(257)
<223> n = A,T,C or G

<400> 370
acttttttttt ttttttttt tttagttttt ttttattttt tacaaatata ctggagaatc 60
atgcaatgct gccagcattg gatgcaatcc ggggccacaa gtctgcacac tcctttgcta 120
ctggtcctgt aatggcagaa cctttcatct cgcctttatt gntcactatg actcctgcat 180
tatcttcaaa ataaagaaac acgccatctt ttctacggta tgactttcgt tgtcgaatga 240
ccactgctgg atgtacc 257

<210> 371
<211> 607
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(607)
<223> n = A,T,C or G

<400> 371
acttttttttt ttttttttt tttttttgct atttagtttt tatttcataa tcataaactt 60
aactctgcaa tccagctagg catgggaggg aacaaggaaa acatggaacc caaagggaac 120
tgcagcgaga gcacaaagat tctaggatac tgcgagcaaa tggggtggag gggtgctctc 180
ctgagctaca gaaggaatga tctggtggtt aagataaaac acaagtcaaa cttattcgag 240
ttgtccacag tcagcaatgg tgatcttctt gctggtcttg ccattcctgg acccaaagcg 300
ctccatggcc tccacaatat tcatgccttc tttcactttg ccaaacacca catgcttgcc 360
atccaaccac tcagtcttgg caagtgcaga tgaaaaactg ggaaccantt ggggttgggt 420
ccacatttgc catggacaag aatgccagga acccgtatgc tttaaggatg aagtctcatc 480
ttcaaaattc ttccccataa atggacttgc caccagngcc attatggcgt gtgaagtccc 540
cancctggcc cataaaccct ggaaaaatnt tggnaaaccg gaaccctttt aaccaatcct 600
ttttttc 607

<210> 372
<211> 607
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(607)
<223> n = A,T,C or G

<400> 372
acgaatgtgg gaattactca ggagcagcag aatatcttta ttttttttaga gtgctggttc 60
cagcaacaga tagaaatgct ttaagttcac tctggggaaa gctggcctct gaaatcttaa 120
tgcagaattg ggatgcagcc atggaagacc ttacacggtt aaaagagacc atagataata 180
attctgtgag ttctccactt cagtctcttc agcagagaac atggctcatt cactggtctc 240
tgtttgtttt cttcaatcac cccaaaggtc gcgataatat tattgacctc ttcctttatc 300
agccacaata tcttaatgca attcagacaa tgtgtccaca cattcttcgc tatttgacta 360
cagcagtcat aacaaacaag gatgttcgaa aacgtcggca ggttctaaaa agatctaggt 420
taaaggttat tcaacangga gtcttacnca tntaagaccc cattacngga atttggtgaa 480
tggttatatg taactttgac tttaangggc tcaaaaaaag ctnaggggat gtgaatcaag 540
cttgngaagg cttttttttgg gggctngntt nngggtttnt tgnaaagncc ngttttnntt 600
ttggaat 607

<210> 373
<211> 618
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(618)
<223> n = A,T,C or G

<400> 373
acttttaatg tttgctgttc aaacgaaaat agattggatc ttggttaagt tcacttggtt 60
tggccaggca cagtggctca cgcctgcagt cccagcactt ggggaggtgg aggcgggccg 120
atcacctgag gtcaagagtt tgagaccagc ctggctaacg cggtgaaacc ccatttctac 180
taaaaataca aaaaattagc tgggcgtggt ggtgcgcgct tgtaatccca gctactcggg 240
aggctgaggc aggagaatcg cttgagccag agaggcaaag gttgcaataa gccaagatag 300
cgccattgta ttccagcttg gacaacaaga gcgaaactct gtctaaaaaa aaaaaaaaaa 360

cacacacaca acacaatatt ttcacgcctg taaacctagc acattgggaa gccaaggtgg 420
gaggattgct tgaggccagg agttcaaggc ttgcantgag ctatgaatgn acactgnacc 480
tttggncgng aacacnctta nggccaaatt ccngcacact tgggggccgg tactaanggg 540
atcccanctt tggnnccaaa nttggngnaa acatgggcaa aattggtncc tggngaaaat 600
ggttccgttc caaatccc 618

<210> 374
<211> 605
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(605)
<223> n = A,T,C or G

<400> 374
acccagctgc tgcccacatt tctggtccag agtcccgaac cccgagcact gggatgcctg 60
gctactccga gcgttatcca gactagcgag tgggaggcag atgtaaaatc tggaacgcag 120
attttagttt gttggaagga gaaatgtaac atagtgaacc acgcatctct ggagggtgta 180
aagcagagac agccaagagc caaggcactg atgtttgaac tggaaacttc aaaacgttta 240
ataagagtct tcaggatggg tttgaactag acaagctaga aatttcttta gaacaccagc 300
tctagcatgc atctcccact tttggctttc ctggagagga gcttgaagag gtggttctgc 360
agacagccac agtgatactc aggaaacnca gaggaatgga tttgactttt ctgctaggaa 420
tctttggtat aagttctcct tgagttgtaa gangcatgga aatatacatg aaactgaana 480
acctgcaagg aanggaaatg ggaacntttc atctgagtgn aaactaacca agtnggcaat 540
ttngacttga aacccttgaa accttcnagt ccaantcctg gtttgggggga taaangaacc 600
ggncn 605

<210> 375
<211> 602
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(602)
<223> n = A,T,C or G

<400> 375
acggatgcta cttgtccaat gatggtaaaa gggtagctta ctggttgtcc tccgattcag 60
gttagaatga ggaggtctgc ggctaggagt caataaagtg attggcttag tgggcgaaat 120
attatgcttt gttgtttgga tatatggagg atggggatta ttgctaggat gaggatggat 180
agtaataggg caaggacgcc tcctagcttg ttagggacgg atcggagaat tgtgtaggcg 240
aataggaaat atcattcggg cttgatgtgg ggaggggtgt ttaaggggtt ggctagggta 300
taattgtctg ggtcgcctag gaggtctggt gagaatagtg ttaatgtcat taaggagaga 360
atgaanagaa gtaagccgag ggcgtctttg attgtgtagt aagggtggaa ggtgatttta 420
tcggaatggg aagtgattnc taaggggntg tttganccccc gtttgtgcca gaatangaag 480
tggaatgctt cttanggctt caataaatga anggcanaat gaattgaaag gtaaanaaac 540
cntnaagggt ggacttgtta ctgataaccn tcctaaaatc attgccccgn aacttggccg 600
gg 602

<210> 376

<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 376
acgcgggatc gaagaattca caaaaaacaa tagcctcatc atccccacca tcatagccac 60
catcaccctc cttaacctct acttctacct acgcctaatc tactccacct caatcacact 120
actccccata tctaacaacg taaaaataaa atgacagttt gaacatacaa aacccacccc 180
attcctcccc acactcatcg cccttaccac gctactccta cctatctccc cttttatact 240
aataatctta taaaaaaaaa aaaaaaaaaa aaaaaaaaaa ncaaaaaaaa aaaaanaaaa 300
aaaaaaaang tncngccatt tttngtttcn ggtaaacngg aatataangn gaaagaacaa 360
acnttggaac atacttaatg gatttttata gaactttgna aaccaaagga gattcatgtt 420
ttanaagtct ggcctttttt atatcttgga agaaaattat gtntggaggc tntaaataaa 480
tcccattatt ttctcaggga atctgggtag gaattgccgg catgggaant tttnnggggc 540
cggatnggaa agtttggcct aanaaatngc nctttntnaa naattttgga attttgggaa 600
gcccnaagca n 611

<210> 377
<211> 367
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(367)
<223> n = A,T,C or G

<400> 377
acgcgggccg tttggcatct ctgccctcat cgtgggtttc gactttgatg tcactcctag 60
gctctatcag actgacccct cgggcacata ccatgcctgg aaggccaatg ccataggccg 120
gggtgccaag tcagtgcgtg agttcctgga gaagaactat actgacgaag ccattgaaac 180
agatgatctg accattaagc tggtgatcaa ggcactcctg gaagtggttc agtcaggtgg 240
caaaaacatt gaacttgctg tcatgaggcg agatcaatcc ctcaagattt taaatcctga 300
agaaattgag aagtatgttg caaaaaaaaa aanananaaatn aaanaagtac ctcggccgng 360
accacgc 367

<210> 378
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 378
ggtacctgga tcctgctcct ctgggttgaa acccgggcgc cgccaagatg ccggcttacc 60

actcttctct catggatcct gataccaaac tcatcggaaa catggcactg ttgcctatca 120
gaagtcaatt caaaggacct gcccccagag agacaaaaga tacagatatt gtggatgaag 180
ccatctatta cttcaaggcc aatgtcttct tcaaaaacta tgaaattaag aatgaagctg 240
ataggacctt gatatatata actctctaca tttctgaatg tctgaagaaa ctgcaaaagt 300
gcaattccaa aagccaaggt gagaaagaaa tgtatacgct gggaatcact aattttccat 360
tcctggagag cctggttttc cacttaacgc aatttatgcc aaacctgcaa acaaacaggg 420
aagatgaagt gatgagagcc tatttacaac agcttaaggg caagaaactg gactggaact 480
ttgtgaagaa gttttcgacc cttagaatgg ttaaaccnac agtgggggga cttgcttttg 540
gaaaanaccg tttattgacn anagtttttt tggactggan atgaaaggng cccnggttng 600
ccccggtttn n 611

<210> 379
<211> 602
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(602)
<223> n = A,T,C or G

<400> 379
acagctggtt ggacctattc atgcatcttc accagcagct ggagcatctc caccccttggt 60
atttctggtg taaattactt gagctctgtg ctttgaaacc agtttgataa gtcctttact 120
aaggagctcc tgaagggctg ccctggccag ggagcctcga atcttcagtc tctcagagac 180
cacagctggg gttataagtt tatagttggg aacttcctta cagagtttat cataggtagc 240
tttgtcaaac aagactaagt tattgagctt gtcccgaact ttgcctttgg accacttctt 300
ctttttggcc ttgcccccgg atttgttcac tgggtctttg nctttcttgg ccgactttcc 360
agcgtccttc ttcttcttgt cgtccttagg cggcattgcc aagctcggag aatagcanca 420
gacacngnaa cctngtcaag atgtcngaca aaaagccccg ggtaccttgg gcgngaacac 480
gcttaaggcg aattccacac actggcggcc gtactanggg gatccagctt nggaccaact 540
tggnggaaac atggcnaact gnttcctngn ggaaaatgtn atccgttaaa attnccccaa 600
at 602

<210> 380
<211> 598
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(598)
<223> n = A,T,C or G

<400> 380
ggtacngcgg ggggtgcctg gctccgtttc ctgcttttgg ttcttacagt agtcggcgta 60
ggccttagat tttttactgt ctcctgaaga atttaacaca aacatggata tcagaccaaa 120
tcatacaatt tatatcaaca atatgaatga caaaattaaa aaggaagaat tgaagagatc 180
cctatatgcc ctgttttctc agtttggtca tgtggtggac attgtggctt taaagaccat 240
gaagatgagg gggcaggcct ttgtcatatt taaggaactg ggctcatcca caaatgcctt 300
gagacagcta caaggatttc cattttatgg taaaccaatg cgaatcagta tgcaaaacag 360
attccggata taatatcaaa aatgcgtgga acttttgttg ccaagaaaag aanaaagaaa 420
agaaaaagnc caaacttggg aacaactgna caaccncaac caaaaanctg ggcnngggac 480

```
tccaaatcac ttatacccag ggaattcacc ccnaatctta ggtcctgata ccttcaacta     540
tatttaatcc ttaaaactta nccgaagagc taatngatga tgtntcctgc cggtaacn       598

      <210> 381
      <211> 631
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(631)
      <223> n = A,T,C or G

      <400> 381
ggtacgcggg gagagtgtgg tcaggcggct cggactgagc aggactttcc ttatcccagt      60
tgattgtgca gaatacactg cctgtcgctt gtcttctatt caccatggct tcttctgata     120
tccaggtgaa agaactggag aagcgtgcct caggccaggc ttttgagctg attctcagcc     180
ctcggtcaaa agaatctgtt ccagaattcc ccctttcccc tccaaagaag aaggatcttt     240
ccctggagga aattcagaag aaattagaag ctgcagaaga aagacgcaag tcccatgaag     300
ctgaggtctt gaagcagctg gctgagaaac gagagcacga gaaagaagtg ctttagaagg     360
caatagaaga agaaccacaa cttcgtaaaa atggcngaan aagaaactga ccnccaaaat     420
gggagcttat taaagagaan ccagangnnc caatngnttg gccaactggg accgtttgca     480
anaagaaggg ttagccccnt tgaanaaatg ccggaagaac caaagaattc caagacccctt    540
gntgcnaaac ttgaacttgc ctaattggtc ttgagaactg ctttttttccc atcccttcta    600
aaatccaaaa atgnacctgc ccgggggccg t                                    631

      <210> 382
      <211> 613
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(613)
      <223> n = A,T,C or G

      <400> 382
acattcccag atttttaagc ctccctcata aacacctgta atcagatcag agtgagaaga      60
aaagcttttt gaaactatgt tttctccagg gaagttctct ttcaacaaga tggttttcac     120
tactgataac ttaacatgct ggaaacctgg taatgtttct atgactttat tttctaacat     180
cttctttaaa tctttaggca tagcatgctc tttggcagct ctcaaggagg gctgtttcca     240
tgtggctcca agttccttga actgctggct gcactgagtg gactgtctgt gtcttgagag     300
ggagctgcat tttcattgac ttatggtccc acaagtgacc ctgaggcaan gtcnaattgg     360
tctncanaac atttttggcc ctctcttctc ctttttgact tttctgagac tgacagttct     420
tttganggaa tccagggnna angcttccnt ctctaatggg ggntaaattc attttccaaa     480
anggncggtt tttgggaaaa tnaaanttga aanggcatcc nttttattaa tgccccnanc     540
ttttaanttc ngattntnaa cttnctgnta gaatttgtgg atccnccaaa ttggcttaat     600
attcaaatag ctt                                                        613

      <210> 383
      <211> 628
      <212> DNA
      <213> Homo sapiens
```

<220>
<221> misc_feature
<222> (1)...(628)
<223> n = A,T,C or G

<400> 383
ggtactttga ccctggaaag gtatgggtct gcttaaaaga aagaagaaac atacacgtaa 60
tcaaataaag cttaacatta tgcagggctt ataatcattt tcagcaacgg actgcaagct 120
gcactgtgaa gaaaatgcat agcagaggag aaagctgggg atctgaggaa ataggtaagg 180
aaaacagtgt caacacacag tggaagaagt gatgaagaca tctattccgg agctcacgtg 240
ccatgccctg ctagcgttcc ttaacaagcc acctgctcca gaaggccaca gcctgaccct 300
cccaagtgga atataaatgc ccaagtgcca catgaagcca ccttctncac tacctaaaaa 360
ggttgtctgg gactgagctc agaacacaca cctttctggg ctaccaaacc tttaagtgga 420
aagaattttt tnctaaatat ctantttna tacccacttt aacgccactt ttatattgaa 480
attgggcttc taattagncc ctttcctcaa ttccttagga nggaactcat aatgggagcc 540
aaccaaccag ggattctacc cccaatngac tgnnctttaa angtattatt aattttgang 600
ggcaaaggtg tgaatggttt acaatacc 628

<210> 384
<211> 620
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(620)
<223> n = A,T,C or G

<400> 384
acaggtaagc cctggctgcc tccacccact cccagggaga ccaaaagcct tcatacatct 60
caagttgggg gacaaaaaaa gggggaaggg ggggcacgaa ggctcatcat tcaaaataaa 120
acaaaataaa aaagtattaa agcgaagatt aaaaaaattt tgcattacat aatttacacg 180
aaagcaatgc tatcacctnc cctgtgtgga cttgggagag gactgggcca ttctccttag 240
agagaagtgg ggnggctttt angatggcaa gggacttcct gtaacaatgc atctcatatt 300
ttggaatgac tattaaaaaa acaacaatgt gcaatcnaaa gtctcggccc atttgcggaa 360
ctttgggggg atgcttgctt cnaccgantt ggtgncaacc tttnnccggt tccanttttt 420
naaattctta gtnnaagcnn aaaaanntag aatancncna nancataact tannaancca 480
tttaanaggt ccctcggccg gaacnnnctt aanggtnaat cccantnnnt ggcgggcgtt 540
actncnggat ccanccttgg nnccaaantn gnggaattca tggcnnaacc gntcctgggn 600
gaantngttn ccttnaaanc 620

<210> 385
<211> 535
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(535)
<223> n = A,T,C or G

<400> 385

ggtacttttt tttttttttt tttttttggt atttagtttt tatttcataa tcataaactt 60
aactctgcaa tccagctagg catgggaggg aacaaggaaa acatggaacc caaagggaac 120
tgcagcgaga gcacaaagat tctaggatac tgcgagcaaa tggggtggag gggtgctctc 180
ctgagctaca gaaggaatga tctggtggtt aagataaaac acaagtcaaa cttattcgag 240
ttgtccacag tcagcaatgg tgatcttctt gctggtcttg ccattcctgg acccaaagcg 300
ctccatggcc tcacaatatt catgccttct ttcactttgc caaacaccac atgcttgcca 360
tccaaccact cagtcttggc agtgcagatg aaaaactggg aancntttgg ggtngggncn 420
acatttgcct tggccaaaat gccnggaacc ggccccgtac cttgnccngg ccggccggtt 480
caaaagggcg aattccacac acttggcggg ccgtactang gggatccaac ttcgg 535

<210> 386
<211> 642
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(642)
<223> n = A,T,C or G

<400> 386
acagcattgg cagtggtgcg tcagaggtgg cagaactatt tcacactaac cagttgaaga 60
ctacacaaga ttaataccat ccagcatcag gatatagctg tggattttac aaaccattct 120
tatttctaac ttcaggagtt gatgtttttc ccagtccatc ttaaaatatt actgctttaa 180
tcacagatca ggtaaaaagg acaacatgca caacctccac ctagaatcct gttgtagcct 240
agacagtgaa atgatatgac atcagaagac tttaaaattg cagctccttt tggatccccc 300
aaagtgtatc tgcactcttc ttcaaacggg ccctctttcc tcaagaagtc agaagtcacc 360
ttcacaangn ctgagaattc cattctgnnc ccaaantgca agggacactn aaggaagaca 420
tcattctttt attccgtnaa agacccttaa ttcatgggng gaaactgggt gcacccgcct 480
nagaatcttt attanactct ttgnccaatt tggttacaga agagntncan tancccccang 540
aannggtagc ctttggagtt tgantcaccc tcataagcac ccttaaacca cctgnttggg 600
gaaccttctt tcactggtcc ctaactttat tangccctaa ag 642

<210> 387
<211> 256
<212> DNA
<213> Homo sapiens

<400> 387
ggaccttttt tttttttttt tttttttttt tgaaaagaaa ggccttacat atttattact 60
gaatccagcc aaccaacgtg ttcataacag attcagagag gaaaacacgt cgaaatctcc 120
agatagtggt gacattttca gcttgatatg gtaacatgat cgtgaccttc agacagcata 180
aatatgtgtg ccatctcatg tgcaattcct tatagaccca gcttggttct tctccaatgt 240
ctccttttgg agttgt 256

<210> 388
<211> 566
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(566)

<223> n = A,T,C or G

<400> 388
ncnagcggcc gcccngncng gnactgaaca ttggtaaaaa attatatgag ggtaaaacaa 60
aagaagtcta cgaattgtta gacagtccag gaaaagtcct cctgcagncc aaggaccaga 120
ttacagcagg aaatgcagct agaaaaaaac cacctggaag gaaaagctgc natctcaaat 180
aaaatcacca gttgtatttt tcagttatta caggaagcan gtattaaaac tgccttcacc 240
agaaaatgtg gggagacagc tttcattgca ccgcagtgtg aaatgattcc aattgaatgg 300
gtttgcacaa gaatagcnac tggttctttt ctnaaaagaa atcctggngt caaggaagga 360
tataagtntt accccctaaa gtggagntgt ttttcaagga tgatgcccat taatgaccnc 420
cagtcgggct tgaagaacna cttgattgct gcaaaaattt gcttttcttg gacttcttat 480
anggcnaacc tgaaanggat ttcatgaagt catgctacnc aggctatatt tgaaatctgg 540
gagaaatcct ggttgcccaa aattgg 566

<210> 389
<211> 629
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(629)
<223> n = A,T,C or G

<400> 389
actttttttt tttttttttt tttttgttt tttttttttt tttttttttt tttttttgc 60
agtttctaag tcattacttt tnattttgaa agatttgnga aactnttcac atcatggtga 120
gagtttgtat gattaataan aagcagcttt ttcatgaaat gcttggaggt gaacgagttn 180
tcagcctgng anatccgacc ntcccattaa ctttgaagtt tctcttgatt aatagaagaa 240
aaaaggggag ggtgaanaaa aggaggaaca tgctaaaaac cttatgacaa tcatccaaat 300
gtgaggaaag aacaacccga ttcaccaact ccactttttc tattttacaa ctttctacat 360
ctcacncttg gattttggcc ttcntggctn aaacantcct ggcantccnt tanagcccct 420
gaaaaagagc cntggntttt ncaaaagacn ntnggnnggn gaannccttn annatgccct 480
gacccnttcn cnaagaactn nntntccggg ntcccaaaag tttgacccan cagcttantg 540
tgaannnaaa actnnccttn aaaggtaatg ggnggaanng gtgannaant gggttttttt 600
ganaagtctt nttttctna aaaccnccg 629

<210> 390
<211> 596
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(596)
<223> n = A,T,C or G

<400> 390
actttaattt atttcccctt tctagtgtat taagaaatga catgcacttt aatttgccaa 60
aagcaatgct tgtattctgg cagcaacatg ctacttctat cacatagtaa agtgaatacc 120
agaactacaa aggcaggagg tgtaagtgaa tttttattgg gaggggaggt tggcaactta 180
aacagcagca aataaagagt gaataaggaa actccctgtt gccacagata cacaagacct 240
ccgtatgtga tacaggagcc atttcaattt gtgaccccta gacagagatg gcaagtgctt 300

ttccattcaa tctaatactt ccggattcct actaaaaagg aatcattaag agcatggaaa 360
agttgcttac tggaaaggaa acccccgaag agtaagggaa gggaatgtga aattaagaag 420
ttatgtggaa tctcttaaat tgnaattact acatttctta atttccaggt atnccaaaca 480
cagtccnttg caaaactggt cagntactta aatnccngat ccattttagg cnttacataa 540
gtgtttggga gtacctatgg tatttnaatg aacttttaaa cttttntccg ccgtcc 596

<210> 391
<211> 625
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(625)
<223> n = A,T,C or G

<400> 391
acacacccag gaaatttgtc atccaccctg agagtaacaa ccttattatc attgaaacgg 60
accacaatgc ctacactgag gccacgaaag ctcagagaaa gcagcagatg gcagaggaaa 120
tggtggaagc agcaggggag gatgagcggg agctggccgc agagatggca gcagcattcc 180
tcaatgaaaa cctccctgaa tccatctttg gagctcccaa ggctggcaat gggcagtggg 240
cctctgtgat ccgagtgatg aatcccattc aagggaacac actggacctt gtccagctgg 300
aacanaatga ggcagnttta gtgtggctgt gtgcaaggtt tccacactgg tgaagactgg 360
tntgtgctgg tgggtgtngn canaggacct ngntnctaaa accncgnntt tgggcaatgg 420
ggctttcgtc taattnttac aannttgntg accaatnggg gatnaactgg anntttttgn 480
tcaanactnt tttggaataa tntccctnnt gcnattngcc ntatttcctg gggaanggtg 540
ttnatatngt natggnnaaa cntntanccg nnntntaatc ttggaatata tatnaatacc 600
ttcttaaaan ntgntnatta tcctt 625

<210> 392
<211> 266
<212> DNA
<213> Homo sapiens

<400> 392
ggtacccata ttgctaatgc taggatcaag ataccacata gccagaacaa gaagttgaag 60
gtaaacatag aatattttat acaggcactc acacctgcca tttcggaaaa ggattaggaa 120
tccagatgcc gtgaatttaa ctattcgtta caggcttgtc ctgcaatatg ctctggagca 180
acttgcctgc agagatttct gtatccacgg cttcagagca gaaagagaaa gcaaagaagt 240
agagggagga ataaaaatcc ccgcgt 266

<210> 393
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 393
ggtacttttt tttttttttt tttttttttt tggttttacc tgtttttatt ccttaaaaga 60

```
aaaaaacaac ttaaatgcat acatacagaa tagaatacac ttacttaagt tttgacagtg    120
aaaaaaaata attacaggtt agatatttaa tccaaggttt aacatgggga tgatctcata    180
aggcaatttc tttcctttaa taaatattaa agtgaatatt attctggaag caaatcatct    240
cctaattctt catcagcaaa atcatcctca tcgatccttt tcttggctgc agtttttggt    300
cgttctattt gagggccaag tgggtccaca taggaggcat ctatttcttt gntactgcta    360
ctttcataag gntcatttgt cccaggtaaa agctctgagt ctggccttan tccgtcaccc    420
tttactactg gcnctatagt ctggccacta tnaacgntag ccttncttnt cnttttgnca    480
cnggagcccc caatgcannt ttngcntgac tttagcncng gnccctaatt cttcattttt    540
ccacctttna gnttttggca antcttgagc cntttttaat cnaagacttn gcanagccaa    600
ttaaaaaccc c                                                         611
```

<210> 394
<211> 340
<212> DNA
<213> Homo sapiens

<400> 394

```
acgagtccca ctatgcgctg cccctgggcc gcaagaaggg agccaagctg actcctgagg     60
aagaagagat tttaaacaaa aaacgatcta aaaaaattca gaagaaatat gatgaaagga    120
aaaagaatgc caaaatcagc agtctcctgg aggagcagtt ccagcagggc aagcttcttg    180
cgtgcatcgc ttcaaggccg ggacagtgtg gccgagcaga tggctatgtg ctagagggca    240
aagagttgga gttctatctt aggaaaatca aggcccgcaa aggcaaataa atccttgttt    300
tgtcttcacg caaaaaaaaa aaaaaaaaaa aaaaagtacc                         340
```

<210> 395
<211> 557
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(557)
<223> n = A,T,C or G

<400> 395

```
acacatcttc aaagcacttc cctttaacgg gaaacttagc tttatgggat ttaaacatta     60
gaaagtggga aaaaaaattc cattttcttg tcattataaa ccaaaacaaa atctagtgta    120
agtcaaggaa actcattcac acttcaggtc cttctcctcc aggaaccagc attgttatat    180
tatttccatt tagcaaaatc tgatgtaatt tagtaatcct tcttccttct ggtgtgattt    240
caaactcagt gacatcttcc agtactttnt tttttttttt tttttttggg gtgttgagct    300
tggacgcttt cttaattggt ggctgctttt aggcctacta tgggtgttaa atttttactc    360
tctctacaag gntttttcct agtggccaaa agaagctggt ccctcttttg gactaccgtt    420
aaaattacca nggggattta aaangggtnt tgngggccaa attnaaagtt ngactangan    480
tctatttttg gccaaccagt nttaaccagg cttcggtang gttggccgcc cccgggtacc    540
ttgggccggg aacacnc                                                   557
```

<210> 396
<211> 617
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature

<222> (1)...(617)
<223> n = A,T,C or G

<400> 396
```
ggtacngcgg ggccactcga gtgcgcaggc gcctggcgat taccggtctc accatggagc     60
ggaaagtgct tgcgctccag gcccgaaaga aaaggaccaa ggccaagaag gacaaagccc    120
aaaggaaatc tgaaactcag caccgaggct ctgctcccca ctctgagagt gatctaccag    180
agcaggaaga ggagattctg ggatctgatg atgatgagca agaagatcct aatgattatt    240
gtaaaggagg ttatcatctt gtgaaaattg gagatctatt caatgggaga taccatgtga    300
tccgaaagtt aggctgggga cacttttcaa cagtatggtt atcatgggat attcagggga    360
agaaatttgt ggcaatgaaa gtagttaaaa gtgctgaaca ttacacttga aaccagccta    420
gatgaaatcc ggttgcttga agtcagttcc aattcagacc ttatggatcc aaatngaaaa    480
atggttgtca actactagat gactttaaaa ttcaggagtt aatggaacac atatttgcat    540
gggatttgaa gttttggggc anattngtta agnggttctc aaatcaattn ttangggctt    600
tcctgccttg ggtnaaa                                                   617
```

<210> 397
<211> 594
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(594)
<223> n = A,T,C or G

<400> 397
```
acgcggggga tcaggactcc tcagttcacc ttctcacaat gaggctccct gctcagctcc     60
tggggctgct aatgctctgg gtcccagggt ccagtgggga ccgtcgtggt gactcagtct    120
ccggtctccc tgcccgtcac ccttggacag ccggcctcca tctcctgcag gtctggtgaa    180
actctccttt acgaagatgg aagcacctac ttgagttggt ttcaccagag gccaggccaa    240
tctccgaggc gcctgattta taaagtttct aaccgggact ctggggtccc agacagattc    300
agcggcagtg ggtcaggcac ttatttcacg ctgaaaatca acagggtaga ggctgatgat    360
gttgggaatt attactgcat gccanggtca aactggcccg tcacttttcg gngaaggacn    420
aaaggtggcc natcaaacca actgnggctt gaccattggc ttcatnttcc cgccatttga    480
taaccantga aatctggact gctttgtggg ngcctgctga aaacttntat nccnanaggc    540
cnaagtcatg acagtttttc natttactcg aaaaatntgg aaatgataat tttn          594
```

<210> 398
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 398
```
acagtggtcc ttttcagagt tggacttcta gactcacctg ttctcactcc ctgttttaat     60
tcaacccagc catgcaatgc caaataatag aattgctccc taccagctga acagggagga    120
gtctgtgcag tttctgacac ttgttgttga acatggctaa atacaatggg tatcgctgag    180
actaagttgt agaaattaac aaatgtgctg cttggttaaa atggctacac tcatctgact    240
```

cattctttat tctattttag ttggtttgta tcttgcctaa ggtgcgtagt ccaactcttg 300
gtattacccct cctaatagtc atactagtag tcatactccc tggtgtagtg tattctctaa 360
aagctttaaa tgtctgcatg cagccagcat tcaatagtga atggnctctc tttggctgga 420
attaccaaac tcagagaaat gnggcatcag gagaacatct taaccccatg aanggataaa 480
agccccaaat ggngggnact tgataatagc nctaatgctt taaanatttg gtccactttt 540
tacctaaggt gagcccattg aaccannggt gctaaangct catacttcca actgaaatgg 600
ttaaggaaaa a 611

<210> 399
<211> 614
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(614)
<223> n = A,T,C or G

<400> 399
actctgtgaa tggtgagagg ctgggcacct acatgggcca taccggagct gtgtggtgtg 60
tggacgctga ctgggacacc aagcatgtcc tcactggctc agctgacaac agctgtcgtc 120
tctgggactg tgaaacagga aagcagctgg cccttctcaa gaccaattcg gctgtccgga 180
cctgcggttt tgactttggg ggcaacatca tcatgttctc cacggacaag canatgggct 240
accagtgctt tgtgagcttt tttgacctgc gggatccgag ccagattgac aacaatgagc 300
cctacatgaa gatcccttgc aatgactcta aaatcaccag tgctgtttgg ggaccccctng 360
gggagtgcat catnctggcc atgaaaagtg gagagctnaa ccagtattag tgccnnagtt 420
tnnanaaggt gttngttnaa tgttaaagga gcantttccg gnagaataac cnacnttcag 480
gttattccnn gganatgacc anngtttnga cccttnnna gtccattaat nccnaacttt 540
tttacnctca aattttnaan tnanaaaact tttngnatna aattnttnaa ttanttgttc 600
tttttcaata tnnn 614

<210> 400
<211> 612
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(612)
<223> n = A,T,C or G

<400> 400
acttacactg tgaaatttta tgatggagta gttcagactg tcaaacatat tcatgtcaaa 60
gctttttcca aagatcaggc ctaaagaaac agatcacaaa agtctttcat catctcctga 120
taaacgagag aagtttaaag aacagagaaa agcaacagtg aatgtgaaga aagacaaaga 180
agataaaccc ttaaagacag aaaagcgacc caagcagcct gataaagaag gaaagttaat 240
ctgttctgaa aaggggaaag tgtcagagaa aagtcttccc aagaacgaga aggaagacaa 300
ggaaaacatt tccgaaaatg acagagagta ttctggagat gcccaagtgg ataagaaacc 360
tgaaaatgac attgtgaaga gtccacaaga aaacttgagg ggaaccnaaa ngaaaacgag 420
gcagaccccc ttccatagct nctactgctg gggattnaaa ctttaaactt tggcacccat 480
acctttggac ttnnnanaag gaaaatttca nagggtgtga agtcctttaa accgtccttg 540
gttgncaaaa ntttttncng ggaaagtcaa aaacttcttt gaaaaccttg ccnangattt 600
ttnnggngac nt 612

<210> 401
<211> 601
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(601)
<223> n = A,T,C or G

<400> 401
ggtacggtaa ctgactccag ggtcactcat actgtgtccg tggtaacggt aagtctgcag 60
ctccatcagg atgggcccct tcccagatct acaataggca gcagcaaacc ttgttgcctc 120
tcggacgcac aggatatcca ttccatccac tctcagccca ggaatgaaat cgcctctctt 180
gtagtaatca gtgctggctg ccgctctctc aacagacgtt cccattccat agcgattatt 240
ctcacagatg aaaatacaag gtaatttcca caaagctgcc atgttgtaag cttcgaatat 300
ctggccctgg ttagcagcac catcgccata taaagtcagg cagacctcat cttttccatt 360
atacttacag gctagagcaa tcccagcgcc caagggcacc tgcgctccta cgatgccatg 420
gccccgtana agtcttggca tacatgtgca tcgatcctcc ttcctttagc acaanctcct 480
tttgncctgt aactgcaaaa tttntcggac ggaaaggccc cggtgnaaag taaagccgtg 540
agcccggnag gctgngatna aanggcttgt ggggttnaag cccggcttca ggtcccacag 600
a 601

<210> 402
<211> 600
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(600)
<223> n = A,T,C or G

<400> 402
acctggagaa gatcaaacag cgactgtttg agaaccttag aatgctgccg cacgcacctg 60
gggtccaaat gcaggcgatt cctgaggacg ccatccctga ggagagtggc cgatgaggac 120
gaagacgacc ctgacaagcg catctcgatc tgctcctctg acaaacgaat tgcctgtgag 180
gaagagttct ccgattctga agaggaggga gagggggcc gcaagaactc ttccaacttc 240
aaaaaagcca agagagtcaa aacagaggat gaaaaagaga aagacccaga ggagaagaaa 300
gaagtcaccg aagaggagaa aaccaaggag gagaagccag aagccaaagg ggtcaaggag 360
gaggtcaagt tggcctgaat ggacctnttc agctctggct ttctgctgag tccctacgtt 420
ctttcccaac cccttaaatt tataatttct attctctggg gatttatata aaaatttatt 480
naatnttaat attcccaggg cccgaaacca agggcccgaa ctnaaggnaa ntttgcttgg 540
gtgagctntt tcaagaacca ccttgcaccc atttttccgt cttaacttta accaaaangg 600

<210> 403
<211> 604
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature

<222> (1)...(604)
<223> n = A,T,C or G

<400> 403
```
actcagtgga tgacgagtgc ttggtgaaat tgttgaaagg cctgtgtctg aaatacctgg      60
gccgtgtcca ggaggccgag gagaatttta ggagcatctc tgccaatgaa aagaagatta     120
aatatgacca ctacttgatc ccaaacgccc tgctggagct ggccctgctg cttatggagc     180
aagacagaaa cgaagaggcc atcaaacttt tggaatctgc caagcaaaac tacaagaatt     240
actccatgga gtcaaggaca cactttcgaa tccaggcagc cacactccaa gccaagtctt     300
ccctagagaa cagcagcaga tccatggtct catcagtgtc cttgtagctt tgtgcagcag     360
ttccgggctg gaagacagag acagctggac agagctcctg aaaacatttc aaaaataccc     420
ccttcccctg gcctgccctg cctttggggt ccancggcac ttcagttgga tggcacaacc     480
tantgtatcc gtgcnnaaan cnaacctggc attttcaccc anntanccaa gggcttttgc     540
caagggnana acagtggagc ccttggcttg ncctataaac atacgggtac cttggccgnn     600
acnn                                                                 604
```

<210> 404
<211> 604
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(604)
<223> n = A,T,C or G

<400> 404
```
ggtactttgt ggataagaaa atggaggaac acatctgatg gagagtgggc atttgacaac      60
aatggaacag gtaaccagca tgtaaaatca aaatataagt gtctttttaa gagctgaaag     120
ctgctgctgg tcattcatta atgtgtcaga catttaatca ggatgctgga ccttcaaaat     180
aactgaaaaa agaaccaaga aaaggcgttt ttgttttcaa caaactttac taaataaccc     240
cggaaaggca atgaacgatc tgacaattta agctctaatg atttaaagct cagctagaag     300
aaagtgaggc atgacatata ctgtcaacgg agggtgaagg aggcagattt ctggaaatgc     360
aatgatccca cacatttgct tcaaggagaa acctgcagac atattttcag gtcttgctaa     420
gtaacaactg gttatttgta atcaatcatt tgggaaagtc tgctatgtag ctaanggcac     480
tgtgaccccn gacaacngat gaaaaggaaa aagcnttgac agcaggaaaa atccttccat     540
cttaaagaat ttaggggaca cctttaaagg aaaaaaattg ntccagcctc atttttacaa     600
ntnt                                                                 604
```

<210> 405
<211> 593
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(593)
<223> n = A,T,C or G

<400> 405
```
acttgcattt caaagcttat aagatataaa tggagatttt aaagtagaaa taaatatgta      60
ttccatgttt ttaaaagatt actttctact ttgtgtttca cagacattga atatattaaa     120
ttattccata ttttcttttc agtgaaaaat tttttaaatg gaagactgtt ctaaaatcac     180
```

```
tttttttccct aatccaattt ttagagtggc tagtagtttc ttcatttgaa attgtaagca    240
tccggtcagt aagaatgccc atccagtttt ctatatttca tagtcaaagc cttgaaagca    300
tctacaaatc tcttttttta ggttttgncc atagcatcag ttgatcctta ctaagttttc    360
atggggagac ttccttcatc acatcttatg ttgaaatcac tttctgtagt caaaggtata    420
ccaaaaccaa tttatcttga actaaattct aaagtatggg tatccaacca tatacatctg    480
ggtaccaaac ataaatgctg acattcntat attatagtna aggcttaatc nacttgcagg    540
tgaatggaaa aaaaataagc ttnaacctag gattctggaa tgaggaatgc tcn           593
```

<210> 406
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 406

```
acttttttttt ttttttttttt ttttttttttg ggactgaatc ttgctctgtc gcccaggctg    60
gagtgcagtg gcgcaatctt ggctcactgc aacctctgcc tcctgggttc aagtggttct    120
catgcctcag cctcctgggt agctgggatt acagacaagc accaccacaa ccagctagtt    180
tttttgttt tgtttttttg agacggagtc tcgctctgtc accaggctgg agtgcagtgg    240
cacaatcttg gctcactgca acctctgcct cctgggttca agagattctc ctgcttcagc    300
ctnccaagta gctgggacta caggtgcaca ccatcacacc tggctaattt ttgtattttt    360
aagtanagac ggggtttcac catgttggcc aggctggtct caaactcctg acctcaagtg    420
aaccggccgc ttancctcca aagtgctggg attacaggcg tgagcccact ggcctggctg    480
accatttggt tattaacagg gcccccaana tgcnccttta ngtgaaaggg natggcccca    540
gggaacaatt nngctgaaaa acaccaaagg ccnantccat aattcnttgg n              591
```

<210> 407
<211> 463
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(463)
<223> n = A,T,C or G

<400> 407

```
ggtactgatt ttaaaaacta ataacttaaa actgccacac gcaaaaaaga aaaccaaagt    60
ggtccacaaa acattctcct ttccttctga aggttttacg atgcattgtt atcattaacc    120
agtcttttac tactaaactt aaatggccaa ttgaaacaaa cagttctgag accgttcttc    180
caccactgat taagagtggg gtggcaggta ttagggataa tattcattta gccttctgag    240
ctttctgggc agacttggtg accttgccag ctccagcagc cttcttgtcc actgctttga    300
tgacacccac cgcaactgtc tgtctcatat cacgaacagc aaagcgaccc aaaggtggat    360
agtctgagaa gctctcaaca cacatgggct tgccaggaac catatcaaca atggcagcat    420
caccagactt caagaattta nggccatctt tcccgggtac ctg                       463
```

<210> 408
<211> 588
<212> DNA

<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(588)
<223> n = A,T,C or G

<400> 408
acaaatatat ataacttaca tttgattgta aggccaacgt tcaaaagtaa aaatgagatg 60
agctctctta ttgttatccg aggtcaagag gctgcaactg tcaaggggat gttctcacca 120
aaagggggtt tgggggaaga ggacacacac aaagctaata aaaccagaat ccccatcccc 180
acaaaactca tgggaacaaa atttaaagga taaaacaaaa cccaccaaga cccatattac 240
aaaccaatat ggtaacctgt gttcccttct atggtatgat tatgtcatgt taccttagtg 300
ttaaaagatt aacataagga aactgcagca atatataaaa gatatattct ctatagagca 360
tatttcgatt gattccatta aaataatgac attagaattc catcatangg ttaaaaccag 420
gacaatactg nttttncttt atttaaaaaa aactaccacc taatgactgn attggtcata 480
acctgaatgg tgtgcaatgg gctcttccat gaatggctgg cngaaacaag cttgggncct 540
gcttgagttt cagctttcct ctttaattta gtngctcaat gataaaca 588

<210> 409
<211> 612
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(612)
<223> n = A,T,C or G

<400> 409
ggtacaaaga tctgacatgt cacccaggga cccatttcac ccactgctct gtttggccgc 60
cagtcttttg tctctctctt cagcaatggt gaggcggata ccctttcctc ggggaagaga 120
aatccatggt ttgttgccct tgccaataac aaaaatgttg gaaagtcgag tggcaaagct 180
gttgccattg gcatctttca cgtgaaccac gtcaaaagat ccagggtgcc tctctctgtt 240
ggtgatcaca ccaatttttc taggttagca cctncagtca ccatacacag ggtaccagtg 300
tcnaacttga tgaaaatcaa gtaatcntgg ccagtctcta aaatcaaatc ttgaatggta 360
tcaattcacc cttgatgaag gggaatcggg ggtaacccgg atgggtgccg ggccttnatg 420
aagtcancca natgaaggga ttcctttggg gcccccaaag aacttttttn attttcacaa 480
cttgnacctt gcccggcggg ccgttcaaaa gggcnaattc cagncacttg gnggccgtct 540
aanggatcca actcggacca acttggcgna anatggcaaa ctggttcctg gggaaatggt 600
atccctccaa tn 612

<210> 410
<211> 353
<212> DNA
<213> Homo sapiens

<400> 410
acgcggaagc agtggtaaca acgcagagta acgcgggatg gcacatgcag cacaagtagg 60
tctacaagac gctacttccc ctatcataga agagcttatc acctttcatg atcacgccct 120
cataatcatt ttccttatct gcttcctagt cctgtatgcc cttttcctaa cactcacaac 180
aaaactaact aatactaaca tctcagacgc tcaggaaata gaaaccgtct gaactatcct 240
gcccgccatc atcctagtcc tcatcgccct cccatcccta cgcatccttt acataacaga 300

cgaggtcaac gatccctccc ttaccatcaa atcaattggc caccaatggt acc 353

<210> 411
<211> 612
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(612)
<223> n = A,T,C or G

<400> 411
ggtacgcggg gagagaaacc tggctttact atggcggttg gaggaacggc agtgatcaca 60
cgtcggctgc tgggaagatc tggattctcg tttcaggtca ccatcagaaa agctaagttt 120
gctgtatagt gaggatcagg agatctgatc ctgattgcag aaccttccct gattacagaa 180
tcttgggttg tatctcccac ttcacccttc tagaccatcc cagaagatct ataagatttc 240
atctgggaaa tcactaggag ttcttggaag ggaaagaagg aagattgttg gttggaataa 300
aaacagggtt gaatgagttc cagaaagcnn ggttctcaac ctcgtggaca gcaatctgca 360
gaagangaga acttcaaaaa accnactana agcancttgc anagaagtaa aatgagaagg 420
ggncttctna ngaaagaaga cacttggncc acagcagaaa aaactttgac cnantnttnc 480
caggaagana ggggggtcc cncttttaaa naaccccctt taagatncng gnggaanacc 540
tcanngacca nccntaaatt nnggaaaccg aaaaggggcn gtcctttttg ntnncagntg 600
cnccnttaan nt 612

<210> 412
<211> 607
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(607)
<223> n = A,T,C or G

<400> 412
acgcggggct ctctcgccag gcgtcctcgt ggaagtgaca tcgtctttaa accctgcgtg 60
gcaatccctg acgcaccgcc gtgatgccca gggaagacag ggcgacctgg aagtccaact 120
acttccttaa gatcatccaa ctattggatg attatccgaa atgtttcatt gtgggagcag 180
acaatgtggg ctccaagcag atgcagcaga tccgcatgtc ccttcgcggg aaggctgtgg 240
tgctgatggg caagaacacc atgatgcgca aggccatccg agggcacctg gaaaacaacc 300
cagctctgga gaaactgctg cctcatatcc gggggaatgt gggctttgtg ttcaccaagg 360
aggacctcac tgagatcagg gacatgttgc tggccaatna ggtgcccagc tgctgcccgt 420
gctggtgccc atttgcccat gtgaangtca cttgtgccca gcccaaaaca cttgtcttng 480
ggcccganaa gaacttcttt tttccaggcn ttaaaatatt cacccсttaa antttcaagg 540
ggccccattt gaaatcctgg annatnngca ttgatcaana ttganacaaa gtggnancnt 600
ccaaccc 607

<210> 413
<211> 606
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(606)
<223> n = A,T,C or G

<400> 413
```
acaggtcaga gtcttctttt cttttctttt tgagatggag tcttgctctg ttgccagact     60
ggagtgcagt ggtgcgatct gggctcactg caatctccac ctcccgggtt caagcgattc    120
tcctgcctca gcctcccgag taactgggac tacaggtgtg cgccaccaag cccagctcat    180
ttttgtattt ttagtagaga tggggtttca cgatgttggc taggatggtc tcgatctctg    240
gtcagagtct tttctgtaaa tatccttggt aaagaagcaa ttttagactg tagctgttgc    300
aaatgcttta aggaagaagc anaacaactg tcagtcttcc tgaaatgaag aaactacacc    360
agggctgcta tatcagagca accccaacca gcactccaat catgatgccc gacagtggcc    420
ccagcttgag aaccagagaa gttccagatg cagagactgt gagctcntga ctatggaat     480
tttngnggcn ntaacccaan tttgagacna aacnaggcct tngncccggt tttnatttgg    540
gngggatttt gcggataaan aaacttgnng gggntnctgc ggnatccatg gaacnccaaa    600
anatng                                                               606
```

<210> 414
<211> 624
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(624)
<223> n = A,T,C or G

<400> 414
```
ggtacttttt tttttttttt tttttttttg tagatgaggt ctcgctatgt tgcccaggct     60
ggagtgcagt tattcacagg tgcaaccaca gggcactgca gctttaaact cctgggctca    120
agcgatcctc ctgcctcagc ctcccaaata gttgggacta gatgcacgca cnaccacgcc    180
tgactcagga cattattctt aaaggtatta tccaggaaac agataaggtc attcataaaa    240
cacacggntt ttttctttag ctcagtgtta acaatgaaag tagattccac tattgaagca    300
caagttgcaa attggtaaca tagngaacat attgntgtag gaaagggggt tcagtgtgnt    360
gtgttatatn agcncttgaa ctttttatgg gngtnataag ccnngttatc ttgncccaaa    420
gaaannccat tttnaggatt ngatggtttt cttannggaa nannctnggg ggnattntgt    480
ngggcatgaa cttttatgtn ggaatcagtc ccatanaggt aaggggtttn aatcccaaaa    540
ancggggnct tttatgggaa atnnccttta cttcaaaggc caaanngatn gtnggtgtca    600
cttcnaantt ccngannnca anng                                           624
```

<210> 415
<211> 609
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(609)
<223> n = A,T,C or G

<400> 415
```
acgcgggtta caacggaagt aaaatctgtc gaaatgcacc atgaagcttt gagtgaagct     60
```

```
cttcctgggg acaatgtggg cttcaatgtc aagaatgtgt ctgtcaagga tgttcgtcgt     120
ggcaacngtt gctggtgaca gcaaaaatga cccaccaatg gaagcagctg gcttcactgc     180
tcaggtgatt atcctgaacc atccaggcca aataagcgcc ggctatgccc ctgtattgga     240
ttgccacacg gctcacattg catgcaagtt tgctgagctg aaggaaaaga ttgatcgccg     300
ntctggtaaa aagctggaag aaggccctaa attcttgaag tctggtgatg ctgccattgt     360
tgatatgggt cctggcaagc ccatgtgttg ttgagagctt tctcagacta tccacctttg     420
ggtngctttg ctggtcgtga natgagacag acaggtgccn gtggggtggc atcaanncat     480
gggacaanaa aggcttnttg ganettgcaa aggtncncaa nttttgncca naagcntcaa     540
aagntaattg aatttttccc ctannnectg cncccncttt tannanggnn ggaaaacggc     600
ttaaanntt                                                             609
```

```
<210> 416
<211> 577
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(577)
<223> n = A,T,C or G

<400> 416
ggtacgagct gattgggaac gggctccaat ggacatggct ctgcagtcaa aatagttagc      60
agatggacag gtttggaaaa tgtgagggcc catatcatca tanccagcaa taaggagacc     120
aacaccatat ggtctccggc catatccgtt gtgttggtat ctgggtcttg cttccaatta     180
gagatacaag actgagacac aggcagtggt ctatcgaata caaatctgga atncaaacac     240
tcctgacgca taaaattaca taacagncta gcatnancag taagcccccg caattgagat     300
accaatatgg ttgtcaacat ggagaatttt tttctgatga cctgccaact cttgatttgc     360
gcccttttca atgcnaaccc aaaactggca tgaagntttt gnatttcaga ccancctgnt     420
ggctgnacct tggcttaaca ggtttccatt ggcntatttc natttggatn aantcttgcc     480
cntggggggn ttcnaancta ggggccatca nttggtcaaa ctgntttnta aaccatgggg     540
gcnggctcng gccttggttg ctggcntcaa caaaaan                              577
```

```
<210> 417
<211> 570
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(570)
<223> n = A,T,C or G

<400> 417
ggtactaaga atattagaga actggaaatc cagttttttt gtggtttttt aagaaagaga      60
atctgactcc attgcccagc ttggagagca gtggtgcaat agctggggct acaggcgtga     120
gccaccacac caggcctgga aacccagttt taatttgtga actacaaatg gttggcaact     180
gattccttaa ttgttattgc aggagtaggc ccaacatgag tccatatgta gtccttctct     240
ggtctggtgg gaactgtggg aaatggtgat gaccgtgact tgaaatactn agaaggtgca     300
tgacaaacaa attccaagta ttccatcttc cttggaagat cttcctctgg ccctatgata     360
taggaagcng gaatcaaatt tgggctcttg ggctaagant aggggtatgg aatgagcccc     420
cgtnaantgg cttgnacttc ttcttcgcta atactgggcc ctggattaaa acctttttgat     480
ttnancnata gntagggctt tccttcttgg ttaatcaatt cccagaaacc aacattccca     540
```

atttgggtaa natactcccct tgtanaaaaa 570

<210> 418
<211> 570
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(570)
<223> n = A,T,C or G

<400> 418
ggtacttcta cacatctgcc taacttggga atgaatgtgg gagaaaatcg ctgctgctga 60
gatggactcc agaagaagaa actgtttctc caggcgactt tgaacccatt ttttggcagt 120
gttcatatta ttaaactagt caaaaatgct aaaataattt gggagaaaat attttttaag 180
tagtgttata gtttcatgtt tatcttttat tatgttttgt gaagttgtgt cttttcacta 240
attacctata ctatgccaat atttccttat atctatccat aacatttata ctacatttgt 300
aagagaatat gcacgtgaaa cttaacactt tataaggtaa aaatgaggtt tccaagattt 360
aataatctga tncagttctt gntatttccc aatagaatgg gactnngnnc tgttaanggc 420
ttaagganaa agggaagata agggttaaaa gttggttaat ggacccaacc ntttnaaaga 480
aatgcnntan anaatanttt natgantaaa naaaggtncc tngcccnggc cggccgtttt 540
aaangggcca atttcnagca cnctnggcgg 570

<210> 419
<211> 574
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(574)
<223> n = A,T,C or G

<400> 419
ggtacacctt tgactacagc tgcagaagtg ttcctttaga caaagttgtg acccatttta 60
ctctggataa gggcagaaac ggttcacatt ccattatttg taaagttacc tgctgttagc 120
tttcattatt tttgctacac tcattttatt tgnatttaaa tgttttangc aacctaagaa 180
caaatgtaaa agtaaagatg caggaaaaat gaattgcttg gtattcatta cttcatgtat 240
atcaagcaca gcagtaaaac aaaaacccat gtatttnact ttttttagg atttttgct 300
ttctgtgatt tttcttnttt tttgatactt gcctaacatg catgtgctgt anaantnagt 360
taaccaggga aataaccttg ngatnatggc ctanctttta gtttangtct tatgaanttt 420
tcattgacca attctaanca ataatggttt annaacaccg tgntntnaaa atttctggta 480
anttggaaat aaaaggtttn nttgaaatgg gccttttcca cnnactttnt ttnncagctn 540
tttcttggna aataagccct nggttcctga aacc 574

<210> 420
<211> 573
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature

<222> (1)...(573)
<223> n = A,T,C or G

<400> 420
acctccggta gaattcggtg aatccatctg gtcctggact ctttttggtt ggtaaactat 60
tgattattgc cacaatttca gctcctgtta ttggtctatt cagagattca acttcttcct 120
ggtttagtct tgggagagtg tatgtgtcga ggaatttatc catttcttct agattttcta 180
gtttatttgc gtagaggtgt ttgtagtatt ctctgatggt agtttgtatt tctgtgggat 240
cggtggtgat atcccctta tcattttta ttgngtctat ttgattcttc tctctttttt 300
tatntagtct tgctagcagt ctatcaattt ntgtngatcc ttttcanaaa aacccngctc 360
ctggaattca tttaatnttt tnaaggggtt ttttngtggc ctctaatttc cttcaagttc 420
tggctctgat ttaagttaat atncctggct ttttggctac nttttgnaan gnggttggcn 480
cntgnntttt ctanntcctn ttnaantggg gatngnttnn aangcccatt ttnggaannt 540
tcccgctttn ntttgggggg catttangtt nnn 573

<210> 421
<211> 582
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(582)
<223> n = A,T,C or G

<400> 421
ggtacgcggg ggtccgccat ttcgtggacg ccgggtgagt gagagagttg gttggtgttg 60
ggccggagga aagcgggaag actcatcgga gcgtgtggat ttgagccgcc gcattttta 120
accctagatc tcgaaatgca tcgtgatttc tgtccattgg actgtaaggt ttatgtaggc 180
aatcttggaa acaatggcaa caagacggaa ttggaacggg cttttggcta ctatggacca 240
ctccgaagtg tgtgggttgn tagaaaccca cccngctttg cttttgntga atttgaagat 300
ccccgagatg canctgatgc aatccgagag ctanattngn angaacacta tgtggcctgc 360
ccgtgtnagg aattggaact ggccgnaatg gttgaaanaa agaangttcg aaaattcgtg 420
gncctncntt cctttggng gtcgtcngnc cttnagaatg attaatcgnn nggaaggang 480
tccttccncc ttnncccnan antttncant aaangaanaa agcttttttt ngcaacccgn 540
aancaggtcc ctttttttag attgggana atagnngagn tc 582

<210> 422
<211> 570
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(570)
<223> n = A,T,C or G

<400> 422
ggtactctga ggctttagat tcagtttggg tctttggggg ggacctctat catcacgcct 60
ataatcatcc cgagagtaat catctctgga gctccacgac cgatcatccc gtctgtcata 120
tcggtcttca tagcggtccc cgcctcctct gtagtcatca tccctgcgat acccactgcc 180
aaatgctctt ctgccactgc ctatccggga atcatagcct ctatcatagt ctctgctgcc 240
tcggtcatca tagcgatccc ggccaccata tcgatccata tcccggcgtg ggccatccga 300

tacccatccc gatacccatc ccgataccgg ctgaatcata acgatctcga tacttgnctc 360
caaagctatc atcacctctt ctaggtgggt aagtcatcaa agctgtctgg tagcaaggac 420
gaagcccttc aagtctggat ctggtttggg cagaatnccc atttttatca cnggccaaaa 480
gnaacgaatc atccctnggc tttaaccnng ngcttgatcn agcaacgtcc acntcgaaat 540
tntcctngtt acctananaa ctcttcattg 570

<210> 423
<211> 584
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(584)
<223> n = A,T,C or G

<400> 423
acccgggtgg ttaaacttcg canaatgcct agatattatc ctactgaaga tttgcctnga 60
aagctgttga nccacggcaa aaaacccttc agtcagcacg tgagaaaact gcgagccanc 120
attacccncg ggaccattct gatcatcctc actggacgcc acaggggcan gagggtggtt 180
ttnctgaagc agctggctag tggcttatta cttgtgactg gacctctggt cctnaatcga 240
gttcctctac naagaacaca ccaataaatt tgtcattgcc acttcaacca anantcngat 300
atcagcaatg taaaaatncc aaancatctt actgatgctt actttaagaa gangaagctg 360
cngaagccca anacancnng gaaggtgaga tctttcgaca canaagtatg agaanttatg 420
agatttacgg agcaangcan ggattgatca nganaagctt ngggcctcac caaatttttn 480
nccaanannt tcaaagttta ttttcntnag tttcnnnggg cttncttgcn antctggggn 540
tggctttgnc ctaatgggaa tttattnctc ccaaaaatgg nggn 584

<210> 424
<211> 547
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(547)
<223> n = A,T,C or G

<400> 424
actcttggtt tgtcaatggg actttccagc aatccaccca agagctcttt atccccaaca 60
tcactgtgaa taatagtgga tcctatacgt gccaagccca taactcagac actggcctca 120
ataggaccac agtcacgacg atcacagtct atgcagagcc acccaaaccc ttcatcacca 180
gcaacaactc caaccccgtg gaggatgagg atgctgtagc cttaacctgt gaacctgaga 240
ttcagaacac aacctacctg tggtgggtaa ataatcagag cctcccggtc agtcccaggc 300
tgcagctgtc caatgacaac gggaccctca ctctactcag tgtcacaagg aatgatgtag 360
gaccctatga gtgtggaatc cagaacgaat taagtgttga ccacagcgac ccagtcattc 420
tggaatgncc tctatggncc aaacgaaccc caccatttcc cctnatacac taattaccgn 480
ccaggggtga accttaagct tttctggcat gcagcctttta cccacctggc acagtattct 540
tggctgn 547

<210> 425
<211> 567
<212> DNA

<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(567)
<223> n = A,T,C or G

<400> 425
ggtaccatcc tttaatagat ctcatacacc agaattcaga tcatgaatga ctgacagaat 60
attttgttgg gcagtcctga tttaaaacta agactggctt gtggttaaat gaatatgttc 120
agtttttgaa ttttaatagt aactccaatt cagtaaatgg tatcactgtt taccccttt 180
aaagatatga ttagacttcg ttagtaatgt tcaacttttc acaaagatgg tgagtgccat 240
cttaaaactt actggagatt ggctttatat ttagatttat ataactggtt atgtgaatat 300
atttaaatac tggggaaatt gcttcactgt cttagaacca agcaagattc acctgtgttt 360
tgtgttcatg ttcatttgcc tcttaaaggc aaggggttga agataaataa ggtagcaatg 420
tctatagttt tggccttaac ctatgccaat cctaattata attccctgga nttnaaaang 480
gttnctttta ccttatttgg aanggcnttt taaatngngg gttnntgggn naatatttaa 540
aggattattc acccctttca catnttn 567

<210> 426
<211> 563
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(563)
<223> n = A,T,C or G

<400> 426
ggtacaattt gttcaaggaa tttttgtaga aaaatacgat cctacgatag aagattctta 60
tagaaagcaa gttgaagtag atgcacaaca gtgtatgctt gaaatcttgg atactgcagg 120
aacggagcaa tttacagcaa tgagggattt atacatgaaa aatggacaag gatttgcatt 180
agtttattcc atcacagcac agtccacatt taacgattta caagacctga gagaacagat 240
tcttcgagtt aaagacactg atgatgttcc aatgattctt gttggtaata agtgtgactt 300
ggaagatgaa agagttgtag ggaaggaaca aggtcaaaat ctagcaagac aatggaacaa 360
ctgtgcattc ttagaatctt ctgnaaaatc aaaaataaat ggtaatgaga atttttatg 420
acctantgcg gcaaattacc ggaaaaactt ccngngcctg ggaaggctng gcaaaaggcc 480
ttcatggtca gntgcttaat tatnctaaat gccntgganc ttttgaccag gntctgaana 540
actgttgncc aattcaacag ggg 563

<210> 427
<211> 567
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(567)
<223> n = A,T,C or G

<400> 427
ggtacttttt tttttttttt tttttttttt tttttgttaa aaaccataca tcctttttat 60

tgntaagtca taaagaggta tcaaaattaa aagcaaaaat tacagggtaa gacttaacaa 120
aactactagg agcgtcaaag gaagtgaaaa tgggactagg cgcggggcaa tatgaattaa 180
tgaacatggg aaggacaagg atggggana a cggtgagcat gtgctgaana tactagggga 240
gaggatctgg tgaaaaattt gatcttanac aagcgcctag gtaaagaaat aatgggataa 300
gatttctaaa ccccactatg gagcttaaga gtcatcctng ccattggcgc tgtctctgnc 360
atcctctcct tcctcaagnc tctttttcat catnctttga tccaattcca gctgggcaat 420
tcccccgatc tttnattatc atcatcattc cantanggnn cccnttctta ggaanngntn 480
ttttggnccc cccttaanat ttcaatttcc cttnnnccca ttttttttan ggagnttgtg 540
gcnntggccc ttttnggntt aaaaatn 567

<210> 428
<211> 578
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(578)
<223> n = A,T,C or G

<400> 428
ggtaccctat gaacctgact ctgtggtcat ggcagaagct cctcctgggg tagagacaga 60
tcttattgat gttggatnca cagatgatgt gaagaaagga ggccctggaa gaggagggag 120
tggtggcttc acagcaccag ttggtggacc tgatggaacg gtgccaatgc ccatgcccat 180
gcccatgcct atgccatctg naaatacngc ctttctcata tccactgcca aagggaccat 240
canatttcaa tggactgcca atggggacct atcaggcctt tnccaatatt catccacctt 300
cagataccag cnactccccc atcgnatgaa tctgnanatg acattaatgc tgataatgaa 360
tatctctttn tgcacanatt gttggtcctg gaccccagcc aanaancctt tgcaaanctt 420
nctttccaga cctggaggat tacttatnga caccnttgtc cctaaccaga agttgnccat 480
ttgngcccng aacancactt tcccaactgg canttngctg gatcccagnn ccttcnggat 540
ttggaanaac nttggctttt gatggatttt ttccccgg 578

<210> 429
<211> 572
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(572)
<223> n = A,T,C or G

<400> 429
ggtaccaaga gtttgctcct ggctgctttg atgtcagtgc tgctactcca cctctgcggc 60
gaatcagaag cagcaagcaa ctttgactgc tgtcttggat acacagaccg tattcttcat 120
cctaaattta ttgtgggctt cacacggcag ctggccaatg aaggctgtga catcaatgct 180
atcatctttc acacaaagaa aaagttgtct gtgtgcgcaa atccaaaaca gacttgggtg 240
aaatatattg tgcgtctcct cagtaaaaaa gtnaagaaca tgtaaaaact gtggcttttt 300
ctggaatgga attggacata gcccangaac agaaagaacc ttgctgggct ggaggtttca 360
cttgcacatc atggaagggt ttagtgctta atctaatttg ggcctcactg gacttngncc 420
atttaatgaa gttnantcat tattgnnatc atagtttgct ttgtttnaan ccttnncatt 480
taaagttaaa actggaattt nanggtaatt tnaacttgta nggtttcctg ggtttagctt 540
tttaaatcnt aatttttcca taagcntttt tg 572

<210> 430
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 430
ggtacagccc aggtaatttg ctgagcctaa tgggtgtcag ggtcagtcta agtgaaggca 60
aagagaggct gggatgaagg gtgcaaagga atagtaaaga aagcatgttt gagatccana 120
acagaataat gggtagtaga gggaggtatt gaggatagaa nagtatatgg gtttggcacc 180
acggggtgga taggcaaaac atttggttga taangcgcag attctgaact aacttgtaag 240
gcttgtctgg ttttaggaca ggtaaaatgg nggaatggta aggagaagtt tataggtttt 300
atgagcccat gctgtancan gcaagtgata actngctttt aatccctttt cnaaagcaat 360
gcctggngnt atgaagnata tttggcattt gatcngggtt tnaanggntg attagngttn 420
ctantgaaca atngnaaagg ggntgccatg atcngtnncc caaggatgng attttanggn 480
antctcntac ttgtggggtt naagggtggn gggnttttac naggngggtc cccnaagggn 540
gcctnttggn tntangnaat aaanggccng nnaatngana atccnnnttn n 591

<210> 431
<211> 565
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(565)
<223> n = A,T,C or G

<400> 431
accagtgatg ttttgataca agcatataat gtttaatgat caagtcagga taaatggggt 60
atccatcacc tcaagcacat ataatcattt ctttgtatta ggcatattca aattccactc 120
ttttagttat ttttaaatat ccagtaaatt agatcttatt cattctatct agatgtattt 180
ttgtacttta tttttctcaa atatttttac ttatgctttt tgtcattatc cacagtgttt 240
ttttttaaag cctgagccac tttgtggttt cagcctcaat ataataatca tccccttact 300
cttagactaa ttccttttcc cctgncactt tgcctgtata ctctgtaaaa atgangacct 360
tagaaaatca acatttcctg gtgaactttg agagactatt acaagcagtg cccaaaacag 420
tangaataag gcaggtaaaa ccagttggga tagccagatn tattattgat ctggtnggac 480
aaanggataa nttggngggc atggtttcca nggcantcgn gaattcccca ttagctttaa 540
gggtcnatnn angntggccc anggg 565

<210> 432
<211> 578
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(578)

<223> n = A,T,C or G

<400> 432
acgcgggggc caccgtggag agcagagcgc ggcggctgga agctgctaag tcagagccgc 60
gatgttccgg attgagggcc tcgcaccgaa gctggacccg gaggagatga aacggaagat 120
gcgcgaggat atgatctcct ccatacggaa ctttctcatc tacgtggccc tcctgcgagt 180
cactccattt atcttaaaga aattggacag catatgaaga caggacatca catatgaatg 240
caccgatatg aagagcctgg ttacagtttc gactcctctc tgnaagtgaa taggcccaga 300
aaggtgtaag agactctttg aatggacata aaattctgct tgttnagaac caagttttgg 360
ntctgggtna ctgacctttc aaaagctaaa attttaaaac tattttgggg aagtttttta 420
tttnnntatt nntcngtttn ttnataaaaa agtaccttgg tnccggnacc acccnttaag 480
ggccnaattn cagncnncnt ngngggccgn ttactttnng ggatncntaa nttcggganc 540
cnaancttgg ggggtaantc angggtcata nnctggtt 578

<210> 433
<211> 563
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(563)
<223> n = A,T,C or G

<400> 433
acttcttctg gccaaaggct gttccacatt cactacattt aaaaggcttc tctccaatat 60
ggattttctc atgctcagta aggttggatt tgccactgaa ggtttttcca cactccttac 120
atacaaaggg cttctctcct gtgtgagttc tctggtgtct gatgaggttt gacttctgaa 180
tgaaagcttt cccgcaatct ttacactcaa aaggtttttc tccagtgtga attttctggt 240
gcgtaaggag gttttccttc tggctaaatg atttccaca ttcattacat tcgaaaagct 300
tctcgccagt atgggtgttc tgatgtttaa tgacatactg cttttggcta aaggcttttc 360
cacactcgtt acattcaaaa gggttctctc tccgtgtgaa aatgctcatg ctcantgang 420
tttgaattgn nggcttgaag acttttccca taccсttaca ggcaaanggg gttttccccn 480
ttggaanatn tntggctgcn tnaagntggt gacatctgga tnggaaacct tttccncatt 540
tccaaaggnn tttttttcnn nag 563

<210> 434
<211> 563
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(563)
<223> n = A,T,C or G

<400> 434
ggtacagctg tctgcattga aaattcatgc atggagaaag ggagtaagca agggagaaac 60
ggtgcgattc acatattccg cgagatcatc aagccagcag agaaatccct ccatgaaaag 120
ttaaaacaag ataagcgctt tagcaccttc ctcagcctac ttgaagctgc agacttgaaa 180
gagctcctga cacaacctgg agactggaca ttatttgtgc caaccaatga tgcttttaag 240
ggaatgacta gtgaagaaaa agaaattctg atcgggacaa aaatgctctt caaaacatca 300
ttctttatca cctgacacca ggagttttca ttggaaaagg atttgaacct ggtgttacta 360

acattttaaa gaccacacaa ggaaacaaaa tcttttcttg aaagaaagta aatngatcca 420
cttctggtga atgaatttga aattcaaagg aatctggcct tcatgccanc aaatgggggt 480
aattcatgnt ggagaataac ctcctttatc cagccgnaca cacctgttgg aaatggatcc 540
aactgctgga aattncttaa taa 563

<210> 435
<211> 558
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(558)
<223> n = A,T,C or G

<400> 435
ggtacgcggg ggaagatggc ggccgtgcag gcggccgagg tgaaagtgga tggcagcgag 60
ccgaaactga gcaagaatga gctgaagaga cgcctgaaag ctgagaagaa agtagcagag 120
aaggaggcca aacagaaaga gctcagtgag aaacagctaa gccaagccac tgctgctgcc 180
accaaccaca ccactgataa tggtgtgggt cctgaggaag agagcgtgga cccaaatcaa 240
tactacaaaa tccgcagtca agcaattcat cagctgaagg tcaatgggga agacccatac 300
ccacacaagt tccatgtaga catctcactc actgacttca tccaaaaata taagtcacct 360
gcagcctggg gatcacctga ctgacatcac cttaaaggtg gcaggtagga tccttccaaa 420
agancttntg gggggaaactn antcttctnt tgaactttca aggaaanggg tgaagtttgc 480
agtcatgggc caattccaga aattttaaat cagnagaaga atttttccta ttaataccaa 540
ctgggtcggg ggagactn 558

<210> 436
<211> 528
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(528)
<223> n = A,T,C or G

<400> 436
ggtacaaaaa aaaccttaca taaattaaga atgaatacat ttacaggcgt aaatgcaaac 60
cgcttccaac tcaaagcaag taacagccca cgatgttctg gccaaagaca tcagctaaga 120
aaggaaactg ggtcctacgg cttggacttt ccaaccctga cagacccgca agacaaaaca 180
actggttctt gccagcctct agagaaatcc cagaacactc agccctgaca cgttaatacc 240
aaggggaaca gttaactcca atacaaggtc aaaatcagca acaagttcta caatccagtg 300
ctgatatcag atacaaagct tcaagggcaa tttcttttcg aaggcttatt ccagtttcgt 360
gaggctagca tgaagtgtgt gcatttgcca ggggcaaatt tctattctca attaacccat 420
gcagcaaant gctacgcatc tggctgagtc cggtttanaa nccatttgcc ggnggaccaa 480
tggaaggggc ccgaattcgt cnnaacttgn cccgggcggg ccgttcaa 528

<210> 437
<211> 576
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(576)
<223> n = A,T,C or G

<400> 437
acttttttttt ttttttttttt ttttttttttt aggtttgagg gggaatgctg ganattgtaa 60
tgggtatgga gacatgtcat ataagtaatg ctagggtgag tggtaggaag ttttttcata 120
ggaggtgtat gggttggtcg tagcggaatc gggggtatgc tgttcgaatt cataagaaca 180
gggaggttag aantagggtc ttggtgacaa aatatgttgt gtagagttca gggganagtg 240
cgtcatangt tgttcctagg aanattgtac nggtgagggt tgtttattat aataatgttn 300
gggtatccgg ctntgaaana atngggccaa ngggcctgcg gtgtattcga ngttnaaacc 360
tgagactagt tcggactccc ntttgcaagg ncccaaaggg ggttnggttt ggcccttgct 420
annggtgnga naataaatcn tntttattgg cccaagggtt cttaacngcn aggagtnaat 480
ccaaaggggt ncntnggntt ttnnnanaaa nggttgnnaa aaggttaaag ggacccncct 540
ttntnnntaa tgntcgnaat gtcaaatnga tngcnn 576

<210> 438
<211> 576
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(576)
<223> n = A,T,C or G

<400> 438
ggtaccccaa ttaccagtat ggtggaccct acccttctt ctctgcattg ggaaacagaa 60
cagagaacag aaaaaatcat tccatcttgc tcttaactct ttccacctat gtgctcagtt 120
tttcaagtag aatttctatt cctttgctgg tgcttttggt tttttccaat gtaggaatca 180
agcttttcag tgcagctttg actttgtttg caacttccag gtcacaactc tggaggaggc 240
tagaaagaat aatggcacct cgatttacac tagcccagga cttcaggttc ttcataccaa 300
catgctctac aagtgttttt gcaaaacaac cttctcttcc attntctttt catcttttta 360
tcttgctcta ttaaccactt nagaaactaa gaatgtccct gcaaggatgt tctggcaatg 420
ntgaaagctt ctccgtcctt ggccaccagg atgcaagtcc ntggttnttg ccagcttggc 480
cnatnggcat tccatnggna nggcttgaac cgttttccag gggcagant cccaaaatgg 540
ccngacacca acccnacang cagacttntt ttagcn 576

<210> 439
<211> 578
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(578)
<223> n = A,T,C or G

<400> 439
cgaggtacgc gggggagaaa aaacctgcgg aaaatggtag cgatggcggc tgggccgagt 60
gggtgtctgg tgccggcgtt tgggctacgg ttgttgttgg cgactgtgct tcaagcggtg 120
tctgcttttg gggcagagtt ttcatcggag gcatgcagag agttaggctt ttctagcaac 180

ttgctttgca gctcttgtga tcttctcgga cagttcaacc tgcttcagct ggatcctgat 240
tgcagaggat gctgtcagga ggaagcacaa tttgaaacca aaaagctgta tgcaggagct 300
attcttgaag tttgnggatg aaaattggga aggttccctn aagtccaanc ttttgttang 360
agtgataaaa cccaaactgt tcagaaggac tgccaaatna aagtatgtnn cgtggtttca 420
aaccntgaat taaaaggctt ttngaccaac atngggnaca attgcttgan nacttgtcca 480
tttcttaaaa ttgggaacnc tggaccnggt nanaaanatt tcngattgga aaantttgga 540
ccncatttta aatcttgctt aaattttggc caatcctt 578

<210> 440
<211> 573
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(573)
<223> n = A,T,C or G

<400> 440
ggtacttttt tttttttttg agacagggtc ttgccctgtc acccaggctc gagtgcactg 60
gagtgatcac agctcactgg cctcaagtga tcctcctgcc ttggcccctt aagtgccagg 120
gttacaggca tgagctacca tgcctggcag aaattcaaga tttggataaa cttacttctt 180
tgccaagcct gttcttcaag ttattcagaa ctgggtgtat accttgtcct catatgtatc 240
ttgtccctgc tgtcttttag gttagcaagg tgtatgaata cttttaagtt ttgtttgttc 300
ttttcctcgt ggtatcaagt gaaatactga tctattctct ggctagggtc aatttacaaa 360
attgccatgg aactgagcca aaaggcccca cgtgggataa aaattnctta ccatcgacgc 420
ccanccgtan tttttcaagg tattggcttt tggaagnttt accaaatttc nggtaaacca 480
aaattcnaaa agnaaaaaat tnccctggng taaccttgcc cgggcggccg ttcaaaaggg 540
cnaatttcca ncacattggg cggccgttaa tna 573

<210> 441
<211> 572
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(572)
<223> n = A,T,C or G

<400> 441
ggtacaaaat tttattaaag gtctttagag agcaacatcc agactccaga atacagctgc 60
caaggagacc ctgttatgct gtggggactg gctggggcat ggcaggcggc tctggcttcc 120
caccccttctg ttctgagatg ggggtggtgg gcagtatctc atctttgggt tccacaatgc 180
tcacgtggtc aggcaggggc ttcttagggc caatcttacc agttgggtcc cagggcagca 240
tgatcttcac cttgatgccc agcacaccct gtctgagcaa cacgtggcgc acagcagtgt 300
caacgtagta gttaacaggg gtctccgctt gtggatcatc aagccatcca caaacttcat 360
ggatttagcc ctctgncctt cggaggttcc cagacaccca caanctngca agcctttggc 420
cccacttttc catgatgaaa ctgnagncac aaccatangc aagggccctt cggacannta 480
aggccttcct aaggagnttg naacncnana naacttttgc ttgggcantg ggcacaccag 540
nacctntaag nggccccctt tttaagcata aa 572

<210> 442

<211> 562
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(562)
<223> n = A,T,C or G

<400> 442
acaggtcaga gtcttctttt cttttctttt tgagatggag tcttgctctg ttgccagact 60
ggagtgcagt ggtgcgatct gggctcactg caatctccac ctcccgggtt caagcgattc 120
tcctgcctca gcctcccgag taactgggac tacaggtgcg cgccaccaag cccagctcat 180
ttttgtattt ttagtagaga tggggtttca cgatgttggc taggatggtc tcgatctctg 240
gtcagagtct tttctgtaaa tatccttggt aaagaagcaa ttttagactg tagctgttgc 300
aaatgcttta aggaagaagc aaaacaactg tcaagtcttc ctgaaatgaa gaaactncac 360
cagggctgct atatcagaac aaccncaacc aagcacttca aacatgatgc cgacaggtgg 420
ccccagctta aaaaaccagg aanaagttcn gantcccnaa actgngaatg cctcttggac 480
ttttggaatt aattgggggc cagtagccaa gttatnagac caaatcangg cntagggccc 540
cgtattattt ggcggggatt tg 562

<210> 443
<211> 585
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(585)
<223> n = A,T,C or G

<400> 443
acttttattt tttggtggtg aaattgactg atgattttcc tttttcttcg ctggactatt 60
gtgccaactg ccaggctgcc tcctgccctt acagccctaa gtggctgcct tctttccatc 120
aactcccaac ttcttcctgt gaagtttaat tgtctcaacg cctccccctc ccccattccc 180
tccatttttc tcccaagaaa cctgactcaa ttatttgcat attttgagaa actgctgcag 240
attagttctt tttgccagtt ttccctggaa ctcctggcct tttgtggagg ggagggatgg 300
agagaatagg aatcttcact agaagccgtg ggaagaattg gaagttacat gctgtatatg 360
caatgtccag cagtctgata aactgacgat tcttaatcaa gattttttcc tgatggggaa 420
gggactttta ttttctttta nagaggggaa agtgtgagct cttcccttat tcctaatggc 480
tatttttgaa gcaaanaagg ccacaacatt ngcacatgcc acctgcnaag gaccttgagt 540
nagtgaagnc tcctaaaact gggttaanaa ccttgttttc tctnn 585

<210> 444
<211> 437
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(437)
<223> n = A,T,C or G

<400> 444
acgcggggac gtgactcagc actttcccca gagcccggac tgcggagaac aatatcctcc 60
tccctaacag ataaacagcc cttgttcctc gggataagga ctggcagtcc cctgacaccc 120
taagaccggc atctgtcgat gttatttccc cagcatggcc gaaacagaag ccctgtcgaa 180
gcttcgggaa gacttcagga tgcagaataa atccgtcttt attttgggcg ccagcggaga 240
aaccggcaga gtgctcttaa aggaaatcct ggagcagggc ctgttttcca aagtcacgct 300
cattggccgg aggaagctca ccttcgacga ggaagcttat aaaaatgtga atcaagaagt 360
ggtggacttt gaaaagttgg atgactacgc ctctgccttt caaggtcatg atgttggatt 420
ctgtgcctgg gtacctn 437

<210> 445
<211> 592
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(592)
<223> n = A,T,C or G

<400> 445
actttttttt tttttttttt tttttttttt taaggtttga gggggaatgc tggagattgt 60
aatgggtatg gagacatatc atataagtaa tgctagggtg agtggtagga agttttttca 120
taggaggtgt atganttggn cgtagcggaa tcgggggtat gctgttcgaa ttcataagaa 180
cagggaggtt aaaagtaggg tcttggtgac aaaatatgtt gtgtanagtt caggggaaag 240
tgcgtcatat gttgttccta ggaanattgt antggtgagg gtgttaatta taataatgtt 300
tgtgtattcg gctatnaana atagggccaa atgggcctgc ngcctattcn atgtttaanc 360
tgagacttnt tcggactccc cttcggcaan gtcnaantgg ggttcggttg ngcnctgcag 420
tgnggagata nntcntntta ntggccaatg gtnnngatgg ccagaataat cannanggnt 480
tcnttnntcn tnaaaaggtc naaatggttn angganaccn cttattagga attgttaatc 540
ttnaatgatn gttntggnga cnctatatgg anaatgtnag gnctactccn ng 592

<210> 446
<211> 599
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(599)
<223> n = A,T,C or G

<400> 446
ggtacggcaa acacaacgga cctgagcact ggcataagga cttccccatt gccaagggag 60
agcgccagtc ccctgttgac atcgacactc atacagccaa gtatgaccct tccctgaagc 120
ccctgtctgt ttcctatgat caagcaactt ccctgaggat cctcaacaat ggtcatgctt 180
tcaacgtgga gtttgatgac tctcaggaca aagcagtgct caagggagga cccctggatg 240
gcacttacag attgattcag tttcactttc actggggttc acttgatgga caaggttcat 300
agcatactgt ggataaaaag aaatatgctg cagaacttca cttggttcac tggaacacca 360
aatatgggga ttttgggaaa gctgtgcagc aacctgatgg actggccgtt ctaggtattt 420
tttttgaagg ttggcagcgc taaaccnggc cttnataaag ttgttgaatg tgctggattc 480
cattaaaaca aagggcaaga attgctgact ttcactaatt nnaatcctcg tnggccttct 540
tcctgaaatc cttggattac cggacctncc cagcttactn accanccttc tcttttngg 599

<210> 447
<211> 588
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(588)
<223> n = A,T,C or G

<400> 447
ggtacgcggg atgagtgtgg aatccagaac aaattaagtg ttgaccacag cgacccagtc 60
atcctgaatg tcctctatgg cccagacgac cccaccattt ccccctcata cacctattac 120
cgtccagggg tgaacctcag cctctcctgc catgcagcct ctaacccacc tgcacagtat 180
tcttggctga ttgatgggaa catccagcaa cacacacaag agctctttat ctccaacatc 240
actgagaaga acagcggact ctatacctgc caggccaata actcagccag tggccacagc 300
aggactacag tcaagacaat cacagtctct gcggagctgc caagccctcc atctccagca 360
acaactccaa acccgtggag gacaaggatg ctgtggcctt ccctgtgaac ctgaggctca 420
gaacacaacc tacctgtggt gggtaaatgg tcagagcctc cagcagtccc aaggctggag 480
ctgtccaatg gcaacangga cctnactcta ttcaatgtca caagaaatga cncaagaacc 540
tatgnatgtg gaatccagaa ctnagtgatg caaaccgaat gaccagnn 588

<210> 448
<211> 593
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(593)
<223> n = A,T,C or G

<400> 448
accatttgtc tgacctctgt aaaaaatgtg atcctacaga agtggagctg gataatcaga 60
tagttactgc tacccagagc aatatctgtg atgaagacag tgctacagag acctgctaca 120
cttatgacag aaacaagtgc tacacagctg tggtcccact cgtatatggt ggtgagacca 180
aaatggtgga aacagcctta accccagatg cctgctatcc tgactaattt aagtcattgc 240
tgactgcata gctctttttc ttgagaggct ctccattttg attcanaaag ttagcatatt 300
tattaccaat gaatttgaaa ccagggcttt tttttttttt ttgggtgatg taaaacncaa 360
ctncctgnca ncaaaataat taaaatagnc acattgntat cttttattag gtaattcact 420
tcttaattan atggntcaat actctaagna tcaaaatntt ccaattatna tggctcacct 480
gaaagaagna tgctctttta aggaatacag cttcttcnat tnacaattta acanggggag 540
aaaattaaan tnaangantt ganatctgga ggngtannaa ngntctcgcn ttc 593

<210> 449
<211> 577
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(577)

<223> n = A,T,C or G

<400> 449
actgtgggtc gaagtaatgg atacggacgt aaccatcttc gccgccgctg ctgtagctct 60
tgccatcagg atggaaggca acactgttga taggtccaaa gtgacccttg actcttccaa 120
actcttcttc aaaggccaaa tggaagaacc tggcctcaaa cttgccaatc ctggtggagg 180
ttgtggttac atccatggct tcctgaccac cgcccaggac cacatggtca tagttggggg 240
agagggcagc tgagttgaca ggacgttctg tccggaaagt cttctgatgt tcaagagttg 300
tggagtcaaa aagcttggct gtgttgtcct tggacncggc acaaacatgg tcatgtccct 360
ggataactgg atgtcgttga tctgccggga gtgctcctta acattcacca acacctcttc 420
anacttggca ctatactggt tgactctcca ctcttatggc cnggatgatg cactccccca 480
aggggtncca aacagnactg gtgatttaga atcattgcan ggatcttatg tagggctcat 540
tgntgcaatc tggcttggat ccgcagtcaa aaaagnt 577

<210> 450
<211> 575
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(575)
<223> n = A,T,C or G

<400> 450
ggtacttgtg atcacactac gggaatctct gtggtatata cctggggcca ttctaggctc 60
tttcaagtga cttttggaaa tcaacctttt ttatttgggg gggaggatgg ggaaaagagc 120
tgagagttta tgctgaaatg gatttataga atatttgtaa atctattttt agtgtttgtt 180
cgttttttta actgttcatt cctttgtgca gagtgtatat ctctgcctgg gcaagagtgt 240
ggaggtgccg aggtgtcttc attctctcgc acatttccac agcacctgct aagtttgtat 300
ttaatggttt ttgtttttgt ttttgtttgt ttcttgaaaa tgagagaaga gccggagaga 360
tgatttttat taattnttnt tttttttttt tactatttat agctttaaaa agggcctncc 420
ttcccctctt ctttctttgg nctctttcat taaccccttc ccagtttttt ttaacttaaa 480
ccccgttctc atggcctngg ccttttgaag cgnttcctct tataaaaagc tttgccgaac 540
aantttttt taccgatccc aaatttatga agggg 575

<210> 451
<211> 573
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(573)
<223> n = A,T,C or G

<400> 451
actaggctaa ctagaaggat ctcatcccca tatgtggtct catttcaagt ctatggatga 60
ctaccttcat tgctgtgtgc gagatggttt cacccccttga aaatatggtc acttcagcat 120
aaaatagtta aatctttata atgatcaatt catcctacct ccttttacat gcagctgaaa 180
aatgacaggc tagggacata gaatattgtg aactttatac tgttagaatc actgtccatt 240
aaatgatcac tagctaatgg tcactaaatt tacaaattaa ggaaattata tatagaatac 300
tgcaaaaaca cagtaaaaag actgaagttc gcccatttct gctcaggaag tctcttcact 360

cctaagcttc atatgttgcc ttctggcttc aaaattctgc tattattact gttttcctcc 420
tttgatcttc ctttggtccc cagtgccaga cttccaagcc ttttngttaa aaagccatct 480
tttggatgcc atttcnaaca gcttcagtga tgcctctgaa aaaggatct gccggctaan 540
atttctcngg ttcgtgcttt ctaccgganc tcc 573

<210> 452
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 452
acaattttat ccctaaaact ctgttgacat caaaatatga cagttgctat atccataaaa 60
tatttacata gcacggcata ttaagcttta gacacttggc aattaaacca cataaaaaga 120
ggacaagacc cccatcctac atgtttggaa tcaggtgttc accggtccct atctggcgac 180
tgtacgcggg tggggtcctt acttgtattc tgttatcagc tgattttgaa acatataata 240
atgattttct tgttcccttc tttaactagc tgcctttaga ttttgataat cacagtctta 300
aaatactagg aaagaagtgg atgggaattg taggcataga tttcatatca agggcatttc 360
aagacagaat ttttaattcc tgtagtaggc ttgctggagc naaaggaaaa tgtgctggtt 420
aaaaatcaac ttatgccatt ttaaaatttg ataaaatttg gagtggcatn ctgctaaggg 480
gagaccttgg gccggacccc cttangggca aattccngca cactgggggg cggtactang 540
gggatccgac ntcggnccan acttggcgna tcatgggctt antgttcctt gnggn 595

<210> 453
<211> 380
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(380)
<223> n = A,T,C or G

<400> 453
ggtacgcggg gagccgcctg gataccgcag ctaggaataa tggaatagga ccgcggttct 60
attttgttgg ttttcggaac tgaggccatg attaagaggg acggccgggg gcattcgtat 120
tgcgccgcta gaggtgaaat tcttggaccg gcgcaagacg gaccagagcg aaagcatttg 180
ccaagaatgt tttcattaat caagaacgaa agtcggaggt tcgaagacga tcagataccg 240
tcgtagttcc gaccataaac gatgccgacc ggcgatgcgg cggcgttatt cccatgaccc 300
gccgggcagc ttccgggaaa ccaaagtctt tgggttccgg ggggagtatg gttgcaaaaa 360
aaaaaannaa aaaaaaaagt 380

<210> 454
<211> 589
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature

<222> (1)...(589)
<223> n = A,T,C or G

<400> 454
ggtactcttg gtttatcaat gggacgttcc agcaatccac acaagagctc tttatcccca 60
acatcactgt gaataatagc ggatcctata tgtgccaagc ccataactca gccactggcc 120
tcaataggac cacagtcacg atgatcacag tctctggaag tgctcctgtc ctctcagctg 180
tggccaccgt cggcatcacg attggagtgc tggccagggt ggctctgata tagcagccct 240
ggtgtatttt cgatatttca ggaagactgg cagattggac cagaccctga attcttctag 300
ctcctccaat cccattttat cccatggaac cactaaaaac aaggtctgct ctgctcctga 360
agccctatat gctggagatg gacaactcaa tgaaaattta aagggaaaac cctcaggcct 420
gangtgtgtg ccactcagag acttcaccta actagagaca gtcaaactgc aaccatgggt 480
gagaaattga cgacttcaca ctatggacag cttttnccaa gatgtcaaac aagactcctc 540
atcatgataa ggntcttacc cctttaattg nccttgttat gcctgccct 589

<210> 455
<211> 589
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(589)
<223> n = A,T,C or G

<400> 455
ggtacgcgga agagacaggg tttcaccatg ttgcccaggc tggtttcgaa ctcctgacct 60
caggtgatcc acccgcctcg gcctcccaaa gtgctgggat tacaggcttg agccccccgcg 120
cccagccatc aaaatgcttt ttatttctgc atatgttgaa tactttttac aattcaaaaa 180
aatgatctgt tttgaaggca aaattgcaaa tcttgaaatt aagaaggcaa aaatgtaaag 240
gagtcaaaac tataaatcaa gtatttggga agtgaagact ggaagctaat ttgcattaaa 300
ttcacaaact tttatactct ttctgtatat acattttttt tctttaaaaa acaactatgg 360
atcagaatag ccacatttag aacacttttt gttatcaagt caatattttt agatagttag 420
aacctggtct taagcctaaa agtgggcttg attctgcagt aaatcnttta caactgcctc 480
gacacacatt aacctttttta aaaatngacc ttcccgaagt cttttggtag catggnacac 540
ctgatgctta natgttcang taattaatat ggnccagnag tnttgtnnc 589

<210> 456
<211> 582
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(582)
<223> n = A,T,C or G

<400> 456
acagaatgtt gatacaaagc ttaaaattct tgcatatggt catagaaaat gcatctttgg 60
ttttgtgttt ttatcacttg cttccaactt aggcttttgg ctcagaagat tattgaataa 120
tgatttgtct tagtttctgt ttcagtaagg gaattctgag gccgttgcta tgataccatc 180
attaagacat tcacatgtct tcatataata tctcttcatt tcaaatccta atcactattt 240
catactatta cagggctttg atgctgccag cactgtcttt tacataggaa attctagatt 300

```
tgcacagtaa tagaggaatt agaagtacct aactatacac tttgattcag cctgctaaat     360
caggggttca atactagctt ggacaaactt tgtaagtaat taattgctac cagccttatt     420
ggaaacaaat tatcaactag tttcccctgc caaatttga aattcactgn ttcacttaat      480
ctattatatt actaataatg gattaataaa gatgaattaa ttattattac ttactagtnt     540
aaatgaaaaa cagggactga aatagtctgn atccgngttg ca                        582

      <210> 457
      <211> 380
      <212> DNA
      <213> Homo sapiens

      <400> 457
ggtacttttt tttttttttt tttttggagt ttttagttta ttaatgttct tgcgaaaaat      60
ccacagtggc cacagctaac atcattgcag cacctttact ccttcggctg tgatccaatc     120
tccagctcac ttctttttgc cagcaccaac attggccttt gcagtccccc tgactttctt     180
cattctgttc ttgcgttcct ttcgttgctt tcttgaggtc tttttcttct catacaggcc     240
atgtcttgca agtctatgtt tgggttcatt tttctttgca taatccaggg aatcataaat     300
catgccaaag ccagttgtct tgccaccacc aaaatgagtt ctgaatccaa atacaaagat     360
gacatccggt gtggtcttgt                                                 380

      <210> 458
      <211> 382
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(382)
      <223> n = A,T,C or G

      <400> 458
acgcggggag aacagccacc cctctctcgg gcactgctgc catgaatgcc ttcctgctct      60
ccgcactgtg cctcccttggg gcctgggccg ccttggcagg aggggtcacc gtgcaggatg    120
gaaatttctc cttttctctg gagtcagtga agaagctcaa agacctccag gagccccagg     180
agcccagggt tgggaaactc aggaactttg cacccatccc tggtgaacct gtggttccca     240
tcctctgtag caacccgaac tttccagaag aactcaagcc tctctgcaag gagcccaatg     300
cccaggagat acttcagagg ctggaggaaa tcgctgagga cccgggcaca tgtgaaatct     360
gtgcctacgc tgcctgtacc tn                                              382

      <210> 459
      <211> 592
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(592)
      <223> n = A,T,C or G

      <400> 459
ggtactgagg aaatattttg taaagtgagc tttgggtata acttagcccc atcattattt      60
agagaataga ggaggaagaa agaggaagga ttttaaaggc agacaatgac agaccattca     120
ggataggtag ggttttaaag ggagataaac acagtctcat caactaagga gagatttgct     180
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gcagtaaata ggatgaggga aatagtctgt gggatgcaag caaaggaagc agggtgcctt     240
agacactgag tggagccaga aagatcatgc ggcctttttc caagtacatg gccaccaagt     300
aagaatggtt ggtgacaaga cagaaggcta aaacaggaag gtaatcttgt gcacctgaca     360
aatngaaaga attaaggatc aaaattgaag caggctntaa gagtttcaag aaattcttaa     420
aacccaaaag tgatttggaa gccccaaact ttccggtaat gctncccatg gcatgatggg     480
ccaaaacctt gggggttcct aagttnnaaa agccctntnc caaattttaa tggacccccct    540
acattttttc taatcaatcc cccctttcca aaaaaatngg acctcntttt tt             592

<210> 460
<211> 578
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(578)
<223> n = A,T,C or G

<400> 460
acgcgggcac tatcctgaat tatgtgcctg tctagataag cagagaccat gccaaagcta      60
taatggaaaa caagtttaca aagagacctg tatttctttc ataaaagact tcttggcaaa     120
aaatttgatt atagttattg gaatagcatt tggactggca gttattgaga tactgggttt     180
ggtgttttct atggtcctgt attgccagat cgggaacaaa tgaatctgtg gatgcatcaa     240
gctatcgtca gtcaaacccc tttaaaatgt tgctttggct ttgtaaattt aaatatgtaa     300
gtgctatata agtcaggagc agctgtcttt ttaaaatgtc tcggctagct agaccacaga     360
tatcttctag acatattgaa cacatttaag atttgaggga tataagggaa aatgatatga     420
atgtgtattt ttactcaaaa taaaagtaac tgttacgttg cgaaaaaaan nnnnnnnnnn     480
naaaaaaaag tnccttgggc cgggaccacg ctagggcaaa tccagcacac tggcggccgt     540
actagggatc cactnggacc agctggcgna atatggnn                             578

<210> 461
<211> 425
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(425)
<223> n = A,T,C or G

<400> 461
acgcggggct ttctggtctc ggccgcagaa gcgagatgac gaagggaacg tcatcgtttg      60
gaaagcgtcg caataagacg cacacgttgt gccgccgctg tggctctaag gcctaccacc     120
ttcagaagtc gacctgtggc aaatgtggct accctgccaa gcgcaagaga aagtataact     180
ggagtgccaa ggctaaaaga cgaaatacca ccggaactgg tcgaatgagg cacctaaaaa     240
ttgtataccg cagattcagg catggattcc gtgaaggaac aacacctaaa cccaagaggg     300
cagctgttgc agcatccagt tcatcttaag aatgtcaacg attagtcatg caataaatgt     360
tctggtttta aaaaatnnan nnnaannntn ntnnaaanaa aaaaagtnct nggccgngac     420
cacgc                                                                 425

<210> 462
<211> 581
<212> DNA
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<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(581)
<223> n = A,T,C or G

<400> 462
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ggtactattg acccagcgat gggggcttcg acatgggctt tagggagtca taagtggagt      60
ccgtaaagag gtatctttac tataaaagct attgtgtaag ctagtcatat taagttgttg     120
gctcaggagt ttgatagttc ttgggcagtg agagtgagta gtagaatgtt tagtgagcct     180
agggtgttgt gagtgtaaat tagtgcgatg agtaggggaa gggagcctac tagggtgtag     240
aataggaagt atgtgcctgc gttcaggcgt tctggctggt tgcctcatcg ggtgatgata     300
gccaaggtgg ggataagtgt ggtttcgaag aagatataaa atatgattag ttctgtggct     360
gtgaatgtta taattaagga gatttgtaag ggagattagt atanagaggt anagtttttt     420
tcgtgatagt ggntcactgg ataantggcc gttggctttg ccatgattgt gaggggtagg     480
agtcaagtag ttagtattan ganggggttt nttaggggtc cnaggaaang ttggggaana     540
ctaaannggt gtngtnattn gtaaaaaata nnnnanggat n                         581
```

<210> 463
<211> 574
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(574)
<223> n = A,T,C or G

<400> 463
```
actgtgtggc gccttattct aggcacttgt tgggcagaat gtcacacctg ccgatgaaac      60
tcctgcgtaa gaagatcgag aagcggaacc tcaaattgcg gcagcggaac ctaaagtttc     120
agggggcctc aaatctgacc ctatcggaaa ctcaaaatgg agatgtatct gaagaaacaa     180
tgggaagtag aaaggttaaa aaatcaaaac aaaagcccat gaatgtgggc ttatcagaaa     240
ctcaaaatgg aggcatgtct caagaagcag tgggaaatat aaaagttaca aagtctcccc     300
agaaatccac tgtattaagc aatggagaag cagcaatgca gtcttccaat tcagaaccaa     360
aaaaaaaaaa naaaaaaaag tacttttttt ttttnnnnnt tttttttttt taggtaatgg     420
gtgttgagct tgaacgcttt cttaattggn ggctgctttt angcctctat gggtgttaaa     480
ttttttactc tcttacaagg tttttcctaa gtccaaanac tgtcctttg gctacagtta      540
aatttccagg ggattaaagg gttttgggcn aatt                                574
```

<210> 464
<211> 580
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(580)
<223> n = A,T,C or G

<400> 464
```
ggtacctagt aagctctccc tcctcccacc ctccaccctc aaggaggccc cagtgtcagt      60
```

tgttcccctc tgggtccatg agttcttatc atttagctcc cacttataag caagaacatg 120
cagtatttgg ttttctgttc ctgccttagt ttgctaagga taacggcctc cagctccatc 180
cagttcctgc aaaggacatg atcctgttct ttctatggct gtatagtatt ccatggtgta 240
tatttaccac attgtcttta tccagtctgt cattgatggg cttttgggtt gattagtagc 300
tttttgaatg gtaacttttc tacagaagta cgcggggctt ttttttttgc tgtaggcccg 360
ggtggttgct gccgaaatgg gcangttcat gaaacctggg aaggtggtgc ttgtcctgct 420
ggacgctact ncggacgcaa agctgtcatc gtgaaagaac attgatgatg gcaccttana 480
cgcccctacag ccatgctctg gtggctggaa ttgaccgcta cncccgaaag tgacagctgn 540
catgggcaag aagaagatcg ccagagatca aagataaaan 580

<210> 465
<211> 578
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(578)
<223> n = A,T,C or G

<400> 465
ggtacttttt tttttttttt tttttttttt ttctacatca ctttanaata tttattgtat 60
tccttaatgc atttcttaac atgtatagca ctctttaatc aagaatataa agtcatctac 120
ttagaatcac attatcttaa agatgcatac tggaatgata agtttgaaga tgtaactatc 180
aacaattctt ttcaaaatca tatcaatata ttactctcat ggaacttgca cattctaaga 240
agggtcattt tttcccccca gtaccaatat tacattattt gacagggata ataaaatgag 300
cagagactgg aaatcacaga caataacatt gctttctcaa ttaacagaaa ggattcataa 360
catattcctt aacggtagat gtgatttgta gagaatgtgg aaaagaacta ttgagaagtc 420
cacctgctgc ccaaactgag gcacattagg gtggttgtgg gangagttat atttgagggt 480
ccatttttcc ttagggttta aaagcatgtc cnggttggng gtnatttgcc attaagtctn 540
ttttcaaata aaagaattag gggagaaagt ttggaaaa 578

<210> 466
<211> 546
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(546)
<223> n = A,T,C or G

<400> 466
accaatacca ccaattttgt agacatcctg gagaggcagg cgcaagggct tgtcagttgg 60
acgagttggt ggtaggatgc agtccagagc ctcaagcagc gtggttccac tggcattgcc 120
atccttacgg gtgactttcc atcccttgaa ccaaggcatg ttagcacttg gctccagcat 180
gttgtcacca ttccaaccag aaattggcac aaatgctact gtgtcggggt tgtagccaat 240
tttcttaatg taagtgctga cttccttaac aatttcctca tatctcttct ggctgtaggg 300
tggctcagtg gaatccattt tgttaacacc gacaattagt tgtttcacac ccagtgtgta 360
agccagaang gcatgctctc gggtctgccc attcttggag ataccagctt caaattcacc 420
aacaccagca gcaacaatca ggacagnaca gtcggnctga gatgtccctg taatcatgtt 480
ttgataaaag tctctgtgtc ctggggcatc aatgatagtc acatagtacc tcggccgcga 540
ncacgc 546

<210> 467
<211> 445
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(445)
<223> n = A,T,C or G

<400> 467
```
acctaaaacc cgaagaacct tctgtaagaa gtgtggcaag catcagcctc acaaagtgac      60
acagtataag aagggcaagg attctttgta tgcccaggga aggaggcgct atgatcggaa     120
gcagagtggc tatggtgggc agacaaagcc aattttccgg aagaaggcta agaccacaaa     180
gaagattgtg ctaaggctgg aatgtgttga gcctaactgc agatccaaga ggatgctggc     240
tattaagaga tgcaagcatt ttgaactggg aggagataag aagagaaagg gccaagtgat     300
ccagttctaa actttgggat atttttcttc aattttgaag agaaaatggt gaaccataga     360
aaagttaccc gagggaaaat aaatacagtg atattccaaa aaaaaaaann nnnnnaaaaa     420
aaagtncttg gccgggaccc cctaa                                           445
```

<210> 468
<211> 566
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(566)
<223> n = A,T,C or G

<400> 468
```
actgtgtggc gccttattct aggcacttgt tgggcagaat gtcacacctg ccgatgaaac      60
tcctgcgtaa gaagatcgag aagcggaacc tcaaattgcg gcagcggaac ctaaagtttc     120
agggggcctc aaatctgacc ctatcggaaa ctcaaaatgg agatgtatct gaagaaacaa     180
tgggaagtag aaaggttaaa aaatcaaaac aaaagcccat gaatgtgggc ttatcagaaa     240
ctcaaaatgg aggcatgtct caagaagcag tgggaaatat aaaagttaca aagtctcccc     300
agaaatccac tgtattaagc aatggagaag cagcaatgca gtcttccaat tcagaaccaa     360
aaaaaaaaaa nnaaaaaaag tacttttttt tntnnnnnnn tttttttag gaatgggtgt      420
tgaacttgac ctttcttaat gggggctggt tttaggctat atggngtaaa tttttctctt     480
ttacaaggtt tttcctagng ncaaaaactg tcctttggac taccgtaaat tacaggggtt     540
taaaggttnt ggggcaatta aanttn                                          566
```

<210> 469
<211> 586
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(586)
<223> n = A,T,C or G

<400> 469
acgcgggata ggtttggtcc tagcctttct attagctctt agtaagatta cacatgcaag 60
catccccgtt ccagtgagtt caccctctaa atcaccacga tcaaaaggga caagcatcaa 120
gcacgcagca atgcagctca aaacgcttag cctagccaca cccccacggg aaacagcagt 180
gattaacctt tagcaataaa cgaaagttta actaagctat actaacccca gggttggtca 240
atttcgtgcc agccaccgcg gtcacacgat taacccaagt caatagaagc cggcgtaaag 300
agtgttttag atcacccccct ccccaataaa gctaaaactc acctgagttg taaaaaactc 360
cagttgacac aaaatagact acgaaagtgg ctttaacata tctgaacaca caatagctaa 420
gacccaaact gggattagat accccactat gcttagccct aaacctnaca gttaaatcaa 480
caaaactgct cgccagacac tcgagccaca gcttaaaact caaggacctg cgggcttcat 540
atccctctag angacctgtc tgtaatcgat aaccccgatc aacctn 586

<210> 470
<211> 487
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(487)
<223> n = A,T,C or G

<400> 470
acggccaggg ctattggttg aatgagtagg ctgatggttt cgataataac tagtatgggg 60
ataaggggtg taggtgtgcc ttgtggtaag aagtgggcta gggcattttt aatcttagag 120
cgaaagccta taatcactgc gcccgctcat aaggggatgg ccatggctag gtttatagat 180
agttgggtgg ttggtgtaaa tgagtgaggc aggagtccga ggaggttagt tgtggcaata 240
aaaatgatta aggatactag tataagagat caggttcgtc ctttagtgtt gtgtatggtt 300
atcatttgtt ttgaggttag tttgattagt cattgttggg tggtgattaa tcngttgntg 360
atgaaatatt tggaggtggg gatcaatana gggggaaata gaatgatcag tacctcgccc 420
gcgaccacgc taagggccaa tccacacact ggcggncgta ctaatggatc ccaactcgga 480
ccagctt 487

<210> 471
<211> 488
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(488)
<223> n = A,T,C or G

<400> 471
actgcggcgg gtaggcctag gattgtgggg gcaatgaatg aagcgaacag attttcgttc 60
attttggttc tcagggtttg ttataatttt ttatttttat gggctttggt gagggaggta 120
ggtggtagtt tgtgtttaat atttttagtt gggtgatgag gaatagtgta aggagtatgg 180
gggtaattat ggtgggccat acggtagtat ttagttgggg cattcccgcg tacctatttg 240
tatttttggt agagacaggg ttttgccatg ttggccagga tggtcttgaa ctactgacct 300
caggtgatcc tcacgccttt atctcccaaa gtgctgcgat tacaggcatg aggcaccact 360
cctggccaca ttcttatatt taaaaaaaaa gcacaactct attgtctact ggtgttcttt 420
tacctgaagt tcaaactcta gctcttcaaa aaaaaaaaaa aaaaaaagta cctnggccgc 480
naccacnc 488

<210> 472
<211> 586
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(586)
<223> n = A,T,C or G

<400> 472
ggtacttgat gccctccaag caattaaaac caagggcaaa cgagccccat tcacaaattt 60
tgacccctct actctccttc cttcatccct ggatttctgg acctaccctg gctctctgac 120
tcatcctcct ctttatgaga gtgtaacttg gatcatctgt aaggagagca tcagtgtcag 180
ctcagagcag ctggcacaat tcagcagcct tctatcaaat gttgaaggtg ataacgctgt 240
ccccatgcag cacaacaacc gcccaaccca acctctgaag ggcagaacag tgagagcttc 300
attttgatga ttctgagaag aaacttgtcc ttcctcaaga acacagccct gcttctgaca 360
taatccagta aaataataat ttttaagaaa taaatttatt tcaatattag caaagacagc 420
atgccttcaa atcaatctgt aaaactaaga aacttaaatt ttagttctta ctgcttaatc 480
aaataataat tagtaagcta gcaaatagta atctgtaagc ataagcttat gcttaaatca 540
gtttagtttg aggaatcttt aaaattacca ctaantgatt gnatgg 586

<210> 473
<211> 575
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(575)
<223> n = A,T,C or G

<400> 473
ggtacaaagg ggaaagggtg catgccaact atcgaattat aggatatgta aaaaatataa 60
gtcaagaaaa tgccccaggg cccgcacaca acggtcgaga gacaatatac cccaatggaa 120
ccctgctgat ccagaacgtc acccacaatg acgcaggaat ctataccta cacgttataa 180
aagaaaatct tgtgaatgaa gaagtaacca gacaattcta cgtattctcg gagccaccca 240
agccctccat caccagcaac aacttcaatc cggtggagaa caaagatatt gtggttttaa 300
cctgtcaacc tgagactcag aacacaacct acctgtggtg ggtaaacaat cagagcctcc 360
tggtcagtcc caggctgctg ctctccactg acaacaggac cctcgttcta ctcacgccca 420
aagaatgaca taggacccta tgaatgtgaa atacagaacc cagtgggtgc cacccgcant 480
gcccantcac cctgaatgtc cgtatgagtc aatcctgccg gcggccgttc naanggcgaa 540
ttccacacac tggcggccgt ctaatggatc cactc 575

<210> 474
<211> 515
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(515)

<223> n = A,T,C or G

<400> 474
ggtacgtggg ggactcaact gaaatcatgg cgtttgacag cacttggaag gtagaccgga 60
gtgaaaacta tgacaagttc atggaaaaaa tgggtgttaa tatagtgaaa aggaagcttg 120
cagctcatga caatttgaag ctgacaatta cacaagaagg aaataaattc acagtcaaag 180
aatcaagcgc ttttcgaaac attgaagttg tttttgaact tggtgtcacc tttaattaca 240
acctagcaga cggaactgaa ctcaggggga cctggagcct tgagggaaat aaacttattg 300
gaaaattcaa acggacagac aatggaaacg aactgaatac tgtccgagaa attataggtg 360
atgaactagt ccagacttat gtgtatgaag gagtagaagc caaaaggatc tttaaaaagg 420
attgaccatt attcttggcg cacagtccaa aatncaaatt ggccagaaga tctatattgn 480
acctgcccgg gcggccgttc gaaaggccaa ttcca 515

<210> 475
<211> 580
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(580)
<223> n = A,T,C or G

<400> 475
acaaagatct gacatgtcac ccagggaccc atttcaccca ctgctctgtt tggccgccag 60
tcttttgtct ctctcttcag caatggtgag gcggataccc tttcctcggg gaagagaaat 120
ccatggtttg ttgcccttgc caataacaaa aatgttggaa agtcgagtgg caaagctgtt 180
gccattggca tctttcacgt gaaccacgtc aaaagatcca gggtgcctct ctctgttggt 240
gatcacacca attcttccta ggttagcacc tccagtcacc atacacaggt taccagtgtc 300
gaacttgatg aaatcagtaa tcttgccagt ctctaaatca atctgaatgg tatcattcac 360
cttgatgagg ggatcggggt agcggatggt gcgggcatca tgagtcacca gatgagggat 420
tccttttgtg ccccaaagat ctttctnact ttgacaactt gaccttggnc gcgaccaccc 480
taaggcgaat tcacccactg gcggccgtct aatggatccn nctcggncca acctggntat 540
atggcntaan tnntccnggn naaatntntc cccncaatcc 580

<210> 476
<211> 593
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(593)
<223> n = A,T,C or G

<400> 476
ggtactatgt gggacagtat tttgcaaata caagaagagc tcagggcagc tgtggagctg 60
gatggtctgc ctggcaggcc tctgtgcagt ctgcctgctc atcctgtccc ctttttgggg 120
cttgatcctc ttctcggtgt catgcttcct catgtatact tacttatctg gccaagaatt 180
gttacctgtg gatcagaagg cagtcctggt gacaggtgtg attgcgggct tggccatgct 240
ttgtgcaagt atctggatga gctgggcttc acggtatttg ccggagtttt gaatgaaaat 300
ggcccaggag ctgaggaatt gcgaagaacc tgctctccgc gcctctcggt gctccaaatg 360
gacatcacga accagtgcag ataaaagatg cttacagcaa ggttgcaaca atgctgcagg 420

```
acaaaagact gtgggctgtg atcaacaatg ctngggtgct tggcttttcc actgatgggg     480
agcttnttnt tatgatgact acnaacaatc ntggccgnga actttttga actgngaggg      540
acaaaacgtt tttcctttt taaaaaancc aagggnggtg gnnaattncn nnt             593
```

<210> 477
<211> 595
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(595)
<223> n = A,T,C or G

<400> 477

```
actacaaggt ttagcatttg ctctgctggt cgacattccc ccagtctatg ggttgtatgc      60
atcctttttc ccagccataa tctacctttt cttcggcact tccagacaca tatccgtggg     120
tccgtttccg attctgagta tgatggtggg actagcagtt tcaggagcag tttcaaaagc     180
agtcccagat cgcaatgcaa ctactttggg attgcctaac aactcgaata attcttcact     240
actggatgac gagagggtga gggtggcggc ggcggcatca gtcacagtgc tttctggaat     300
catccagttg gcttttggga ttctgcggat tggatttgta gtgatatacc tgtctgagtc     360
cctcatcagt ggcttcacta ctgctgctgc tgttcatgtt tttggnttcc caactcaaat     420
tcatttttca agtgacagtc ccgtcacaca ctgatncagt ttnaatttta aaagtacctc     480
ggccgcganc accctaaggc gaatttnaac ccactngcgg ccgttctant ggatccaact     540
ngnnncaaac ttngngaata ngggcataac ngntcctggg gaaatnnttc ccnct          595
```

<210> 478
<211> 420
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(420)
<223> n = A,T,C or G

<400> 478

```
ggtacacagt atgtataaca atgcatacta tggtgtggag ttaattccaa ttaccatatt      60
ttatatttat tggtcacaac agcatacatt ttatgctcca aaatacatgg atctgacaaa     120
atggttacat ttaatgttct tttaaagaaa gatgaactaa atttaagaag aattggtttt     180
tcctaatatc tcattttcaa attactgata caaatttgcc agagaaacaa ttacatgttt     240
tacctaacat caaataatct ccagtttcta agacagatgc atttcttgtt caatttccaa     300
aagtaaataa aggctttcta actgaaaaca tttgcatccc tagctctcta aagtaattaa     360
aaagaaaatt acaaaaaatg acctctaagc ttctgaacag cccacttant tacataaagt     420
```

<210> 479
<211> 602
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(602)

<223> n = A,T,C or G

<400> 479
```
ggtacctagt cagatggtag acgagctgtc tgctgccgca ggagcacctc tatacaggac     60
ttagaagtag tatgttattc ctggttaagc aggcattgct ttgccctgga gcagctattt    120
taagccatct cagattctgt ctaaaggggt tttttgggaa gacgttttct ttatcgccct    180
gagaagatct accccaggga gaatctgaga catcttgcct acttttcttt attagctttc    240
tcctcatcca tttcttttat acctttcctt tttggggagt tgttatgcca tgatttttgg    300
tatttatgta aaaggattat tactaattct atttctctat gtttattcta gttaaggaaa    360
tgttgagggc aagccaccaa attacctang ctgaggttag agagattggc cagcaaaaac    420
tgtgggaaga tgaactttgt cattatgatt tcattatcac atgattatag aaggctgtct    480
taatgcaaaa aacatactta catttnanac atattccaan gggatctcnc attttgtaaa    540
aagttgacta ttactggagt aaaccctgtt ttccctaant ttaacttttt ttgggaaatt    600
at                                                                   602
```

<210> 480
<211> 600
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(600)
<223> n = A,T,C or G

<400> 480
```
ggtacttttt tttttttttt ttttttttttc ggtttgaggg ggaatgctgg anattgtaat     60
gggtatggan acatgtcata taagtaatgc tagggtgagt ggtaggaagt tttttcatag    120
gaggtgtatg agttggtcgt agcggaatcg gggtatgct gttcgaattc ataaaaacag    180
ggaggttana agtagggtct tggtgacaaa atatgttgtg taaagttcag ggganagtgc    240
gtcatatgtt gttcctagga aaattgtagt ggtgagggtg tttattataa taatgtttgt    300
gtattcggct atgaaaaata gggcgaaggg gcctgcggcg tattccatgt tgaagcctga    360
gactagttcg gactcccctt cggcaaggtc caaaggggtt ccggttggtc tcttctagtg    420
tggagataaa tcatattatg gccnagggtc atgatggcag gagtaatcaa aggggtcntt    480
tgttttgaaa aagggnggan aggttaaagg anccccttttt tataatggtg atantaaaaa    540
gatgcttggg ggactcnttt aaaatgttgg ctcttcttcc angcncccac aggcgtattt    600
```

<210> 481
<211> 594
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(594)
<223> n = A,T,C or G

<400> 481
```
cgaggtacgg ccagggctat tggttgaatg agtaggctga tggtttcgat aataactagt     60
atggggataa ggggtgtagg tgtgccttgt ggtaagaagt gggctagggc atttttaatc    120
ttagagcgaa agcctataat cactgcgccc gctcataagg ggatggccat ggctaggttt    180
atagatagtt gggtggttgg tgtaaatgag tgaggcagga gtccgaggag gttagttgtg    240
gcaataaaaa tgattaagga tactagtata agagatcagg ttcgtccttt agtgttgngt    300
```

atggttatca tttgttttga ggttagtttg attagtcatt gttgggtggt gattantccg 360
ttgttgatga gatatttgga ggtggggatc aatagagggg gaaatagaat gatcagtacc 420
tgcccnggcg gncgctcgaa anggcgaatt ccaccacact ggcgggcgnt ctaatggatn 480
cgacccngtc ccaacttgcg taatcatggc atacttgttn ctggtgaaat ggtatccctc 540
acaattccca cacatacaac ccgaacctaa atgtaaanct gggggcctat natn 594

<210> 482
<211> 600
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(600)
<223> n = A,T,C or G

<400> 482
accatgaaat acatatattt cataaggttc agttacaaaa tggattgttt caaatggcaa 60
tttcttacac taacctgatt atgaaaaaaa gaagtctgta tcatctgctt ccaagtctgt 120
tatgtccaaa tatattttaa ttatgcattt attttgctac ttttataaat attagagatt 180
tcaccttaaa ttatttttgt aactagttct agaacatgtt ttccaattat tatttttcta 240
atggagacat ataattgacc tatgtttatg catatatgtt ctctacacag tgaaactttt 300
tttaaaaaga atagtaaaga aaatgcggaa gctctggctc tccaaggcaa agtcaaaaaa 360
aaaaaaaaag cggggggggaa tgcgaggaac attttattac acctnctgat tttcctcctt 420
gagntttatt ttctcccctt ggntatttgt taatgctaga aactgnattc ctaanaaagc 480
atacctcttt caggngagcn tgataattgg gaanaatttt gttcctttag tntgaacatt 540
ttattaagaa gngattccta ataaaganac aangggctnt ttaattnttt gggggnngga 600

<210> 483
<211> 605
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(605)
<223> n = A,T,C or G

<400> 483
acagaacatc gtcagcacta gcacagttta cagaacctca cagacccaaa ggaacatcaa 60
taggcaaagc gactacagga ggcgtgtgtc cgcgtgggcg aggtaaagag ggtcagtatt 120
ggtcaagtga cagtgtcggt aatctggcaa gacagtgatg ttaagaaggt tcatagttta 180
agaattatct aaaatatttt aaaaactata aagctgcaac acatgatttt tacacctagt 240
tactagaaaa ctaaggaaag cacttattag ctctgaataa agtaacatgg aaagcacttt 300
tactaatcga caaaaaaacc ttctaatgca ttatcagaaa gattttataa tacaaggagg 360
catattgctc agtcagaagg ggttctataa gaaaagcact tactaagtta gcgactaaca 420
gaacaaccng tttaaagatg aattaaatgc cccatttggg gangcatggc aggtgttaag 480
anaaangaaa agcntaagaa aacatttnct ggttatanca aacctttntt tnttatctac 540
tgnatttgac aaaaattaac cntttaaagt tttacccngg cacttnnttc nttgtcctcg 600
gcccg 605

<210> 484
<211> 591

<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 484
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ggtacgcggg tggggagacc ctggggtagc agccactgac ctcacacctg gaggaagctg      60
tgtgaccgat tcatgagctt atgcctgaag acagagcaag cactccccgc accacgacga     120
tgacgttcac ttgttttgtg tttttcgatc tcttcaacgc cttgacctgc cgctctcaga     180
ccaagctgat atttgagatc ggctttctca ggaaccacat gttcctctac tccgtcctgg     240
ggtccatcct ggggcagctg gcggtcattt acatcccccc gctgcagagg gtcttccaga     300
cggagaacct gggagcgctt gatttgctgt ttttaactgg attggcctca tccgtcttca     360
ttttgtcaga gctcctcaaa ctatgtgaaa aatactgttg cagccccaaa gagagtccag     420
atgcaccctg aaagatgtgt agtggaccgc acttccgcgg naccttccta atnatttcaa     480
ctgggtgnga ctgtggccct gccctgtttc ttcttagggg agactttang anggcgagcn     540
tcataccgga tagttttctt taggaaactn aggaaccttg gctcaggacc a              591
```

<210> 485
<211> 605
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(605)
<223> n = A,T,C or G

<400> 485
```
ggtacgcggg gatataaagg gagagagcaa gcagcgagtc ttgaagctct gttnggtgct      60
tnggatccat ttccatcggn ccttacagcc gctcgtcaga ctccancagc caanatggtg     120
aancagatcg agagcaagac tgcttttcan gaagccttgg acgctgcang tgataaactt     180
gtagnagttg acttctcagc cacgtggtgt gggccttgca aaatgatcaa gcctttcttt     240
cattccctct ctgaaaagta ttccaacgtg atattccttg aagtagatgt ggatgactgt     300
caggatgttg cttcagagtg tgaagtcaaa tgcatgccaa cattccagtt ttttaagaag     360
ggacaaaagg tgggtgaatt ttctggagcc aataaggaaa agctttgnag ccnccattaa     420
tgaatgagtc taatcatgtt ttctgaaaac ataacccagc catttggcta tttaaaactt     480
gnaantttt nagntaccna aatttaaagt ctgaagacat aacccggtgc catttgcgtg      540
acaatnaaaa attatgccaa cactttttna anaanganan nnntttcctn gggaaatngt     600
anccc                                                                 605
```

<210> 486
<211> 319
<212> DNA
<213> Homo sapiens

<400> 486
```
ggtaccagtt gtagccataa agattctggg actcattatg gactactaga aggacctcct      60
tcccttctgc gacattgaac ggcacgacat caatattggt ctgggcactg tttggcaggt     120
tccagaaggt taaaagcgag gctgtgagca ggagtccctg ccagggaatg cacactctgt     180
atggacaggc tgaaggggac cccatggtct ctgctgcctg cttgtcctct gtggagaaga     240
```

```
gcttgggctc caggaactct cttgtcaggg ctgctgtgac tgtcagctct gctgtccttc     300
ctacctctgt gtcccgcgt                                                  319

      <210> 487
      <211> 586
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(586)
      <223> n = A,T,C or G

      <400> 487
acgcgggagc tgagtgtccc gcggggcccg aagcgtttac tttgaaaaaa ttagagtgtt      60
caaagcaggc ccgagccgcc tggataccgc agctaggaat aatggaatag gaccgcggtt     120
ctattttgtt ggttttcgga actgaggcca tgattaagag ggacggccgg gggcattcgt     180
attgcgccgc tagaggttaa attcttggac cggcgcaaga cggaccanag cgaaagcatt     240
tgccaagaat gttttcatta atcaagaacg aaagtcggag gttcgaagac gatcagatac     300
cgtcgtagtt ccgaccataa acgatgccga ccggcgatgc ggcggcgtta ttccatgacc     360
cgccgggcag ctttcnggaa accaaagtct ttgggttncc gggggagtat ngttcnaaaa     420
aaaaaaaaaa aaaaaaaagt cctnggccgg gancccctta nggngaaatt cagccactgg     480
nggcgttctn atggatncna gctcggncca acntggcgta atatggcata cttgttcctg     540
gngnaaatgt ttccctccaa attccccaaa tacgggcgga gcttaa                    586

      <210> 488
      <211> 487
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
      <222> (1)...(487)
      <223> n = A,T,C or G

      <400> 488
acagctggtt ggacctattc atgcatcttc accagcagct ggagcatctc caccccttggt     60
atttctggtg taaattactt gagctctgtg ctttgaaacc agtttgataa gtcctttact     120
aaggagctcc tgaagggctg ccctggccag ggagcctcga atcttcagtc tctcagagac     180
cacagctggg gttataagtt tatagttggg aacttcctta cagagtttat cataggtagc     240
tttgtcaaac aagactaagt tattgagctt gtcccgaact ttgcctttgg accacttctt     300
ctttttggcc ttgcccccgg atttgttcac tgggtctttg tctttcttgg ccgactttcc     360
agcgtccttc ttcttcttgt cgtccttaag cggcattgcg aanctcggag aataagcaac     420
aaacaccgca cctcgtcnaa gatgtcggac aaaaaaaggc cccgcgtacc ttnggccgcg     480
ancacnc                                                               487

      <210> 489
      <211> 589
      <212> DNA
      <213> Homo sapiens

      <220>
      <221> misc_feature
```

<222> (1)...(589)
<223> n = A,T,C or G

<400> 489
acgcggggtc tctcctcagg cagcagcaac gcggaggaaa cgggagtgaa cggagagcgt 60
agtgaccatc atgagcctcc tcaacaagcc caagagtgag atgaccccag aggagctgca 120
gaagcgagag gaggaggaat ttaacaccgg tccactctct gtgctcacac agtcagtcaa 180
gaacaatacc caagtgctca tcaactgccg caacaataag aaactcctgg gccgcgtgaa 240
ggccttcgat aggcactgca acatggtgct ggagaacgtg aaggagatgt ggactgaggt 300
acaaagatta aattaagaca cggtaaattg actaaatatt tggtttttat ataaataaag 360
gtcataacca caccgttgac atgtaatact gttataatac aacagttaaa ctttgtgagt 420
ctcaacagaa gtcatctgta gttnaacagg aaacaaaagt tgaaaaaaaa catgttnaaa 480
caaaactctg ggactaacag gtcgggattg taagtacaac caacatattc ctcacttctg 540
ggtntttcaa gtttacagta cttggccgga ccccccttang ggnattcac 589

<210> 490
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 490
ggtaccggga tagtttttgc agggttttat tttataaaat ccaagcgcgc tgttgattgt 60
gttttccttg ttttcagccc cccgactcca gcccgcagca catttccgct gtccgtcagt 120
aattgtgtcc tctctttatg cttgcttggg gaatgttgtt ttctgactag gctgatcatt 180
atctaaagaa tctaattctg ttgattttta aaacttttag gaccataaac gttgtgttca 240
tatatggaca tggaaatatt tatataattt tatagaaaat aacctttttag atggtcaaag 300
tgtaaggagt ttttttgtc agataatcat ttctacttca aaaacatttc atgcaatatt 360
agaataaagt tcctgtcatt cctctnnnan aaaaannnnn nnnnnnanna nnnnnnnnnn 420
nggaanannn nnnnnnnnnn aaaaaagtac ctgcccnggc ggccgttcaa aaggcgaatt 480
ccacccactg gcggccgttc taatggatcc anctcggacc aacctggnga aacatggcat 540
acctgttcct ggngaaatgg tntcccttac aattcccaca aataaaaccg g 591

<210> 491
<211> 583
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(583)
<223> n = A,T,C or G

<400> 491
ggtacatata aatccttttg gtgtcacttg tagcaagcct tgcttctgca gttttcggat 60
tttcctcaaa gctttgttgc gcttgcgtag aattcgaagt ggactaaagc caacagcatc 120
gataagtttc cgcctaaaga aaccaatgtt tgcaaagtag ataggagatg gacatctgaa 180
aattttcact ccttctggct catacatatc ataataatct tttttattct tatagatgtt 240
ggttcttcca atattagcca gcgtgctgca ttttggaaat tgggtcctga acacgatggt 300

tagcagttga aatgccacac tagctgccag gcctaacccg agtcccagga caatggtgaa 360
agatgaaagg catgaaccca aataaacaat catatttggn cnttccccca atctgctatt 420
ttaaccaact gcatcaacat tcctttaagt tccaatgcta aactggcang acnggcnttt 480
gtagaagngc cangaaaaat cagngcttga cgacaatcac accatgatgn nccataancc 540
acaatctggg nttggctcnn ggcctctgaa cnnngactgg nag 583

<210> 492
<211> 597
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(597)
<223> n = A,T,C or G

<400> 492
acgcgggggg tggcacggag gaaccaggag cgtgccctgc gcaccgtctg gagctccgga 60
gatgacaagg agcagctggt gaagaacaca tatgtcctgt gaccgccctg tcgccaagag 120
gactggggaa gggaggggag actatgtgtg agcttttttt aaatagaggg attgactcgg 180
atttgagtga tcattagggc tgaggtctgt ttctctggga ggtaggacgg ctgcttcctg 240
gtctggcang gatgggtttg ctttggaaat cctctangag gctcctcctc gcatggcctg 300
cagnctggca acaaccccga gttgtttcct cgctgatcga tttctttcct ncaggtagag 360
ttttctttgc ttatgttgaa ttccattgcc tttttctcat cacaaaaaat gatgttggga 420
atcgnntctt ttgtttggct gaattatggg ntttttaant ataaaccaaa ntttttttatt 480
aacattctta aanaagggaa agtnnaatgt ncnttggncc cnaccncgct aanggcnaat 540
ttcanccccnt ggnggccgtn nttnnggatc cnnncnngnn ccaannntgg nntantn 597

<210> 493
<211> 591
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(591)
<223> n = A,T,C or G

<400> 493
acggatgcta cttgtccaat gatggtaaaa gggtagctta ctggttgtcc tccgattcag 60
gttagaatga ggaggtctgc ggctaggagt caataaagtg attggcttag tgggcgaaat 120
attatgcttt gttgtttgga tatatggagg atggggatta ttgctaggat gaggatggat 180
agtaataggg caaggacgcc tcctagtttg ttagggacgg atcggagaat tgtgtaggcg 240
aataggaaat atcattcggg cttgatgtgg ggaggggtgt ttaaggggtt ggctagggta 300
taattgtctg ggtcgcctag gaggtctggt gagaatagtg ttaatgtcat taaggagaga 360
aggaagagaa gtaagccgag ggcgtctttg attgtgtagt aagggtggaa ggtgatttta 420
tcggaatggg aggtgattcc taaggggtg gttgatcccg tttcctgcca agaataagaa 480
gtggaatgct gctagggctg cattaatgaa ggccaagatg aaatgaaagg taaanaatcn 540
ngtganggggg gactgctact gatancctct caaatcatga ataggntgtc c 591

<210> 494
<211> 374
<212> DNA

<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(374)
<223> n = A,T,C or G

<400> 494
ggtacttttt tttttttttt tttttttttt ttttttagnt catgtctttt attaactcat 60
acagttactt gtcttctggt ttgttgaaac agtaagtcan acaacatttg ccacaataat 120
gtctgtcaaa gtgacttgcc ataaacaccc cagcaccaca ttcatcanaa gggcactctc 180
gacgaaggcg actaattttg ccattctcat ccaccttata atatttcagg acagccagct 240
taaccttctt tctcttgtgc ttattcttct tgggagnggt gtaagacttc ttcttccttt 300
tcttagcacc accacgaagt ctcaacacaa gatgaagagt agactccttt tgaatattgt 360
aagtcagaca aagt 374

<210> 495
<211> 597
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(597)
<223> n = A,T,C or G

<400> 495
actgggagaa ggtgctgacg ccgacgaagt ggtggatggg cttcccgctg caggtgaacc 60
tcctggtgcc atcctgcagg gtcccccgag gattgcctag atcatttttc aagcagtagt 120
tgctttctgg gtttttacaa attctgcatt ttccacactg aggagtaaag agcgggatga 180
ctttatcacc tggtttgact gtagtcaccc cttctccaac actttccacg atgccggctg 240
cctcatggcc taaaatcaca ggaagggggg tcaccaggtt gccactaacc acatgctcat 300
ctgaacgaca gattcctgca gccaccatct taatgcgaac ttcatgagcc ttaggaggtg 360
caacctctac ctcctcaatg gaaaagggtt tctttaactc ccatagcaca actgctttgc 420
atttgattac ctgtaaactc agctacttgt gaaggctgag gcanganaat actttgaacc 480
ccggaaggca aaggttgcaa tgagccnana acaccattgn acttccanct gggcaatana 540
aaaaaactca tttttcctgc tggctcaaat gatctgcttc ttgcaaacaa gagntgn 597

<210> 496
<211> 604
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(604)
<223> n = A,T,C or G

<400> 496
ggacgcgggt gctgactgca tagctctttt tcttgagagg ctctccattt tgattcagaa 60
agttagcata tttattacca atgaatttga aaccagggct tttttttttt tttgggtgat 120
gtaaaaccaa ctccctgcca ccaaaataat taaaatagtc acatttatct ttattaggta 180
atcacttctt aattatatgt tcatactcta agtatcaaaa tcttccaatt atcatgctca 240

cctgaaagag gtatgctctc ttaggaatac agtttctagc attaaacaaa taaacaaggg 300
gagaaaataa aactcaagga gtgaaaatca ggaggtgtaa taaaatgttc ctcgcattcc 360
cccccgcttt tttttttttt ttgactttgc cttggaaagc cagagcttcc cgcatttttct 420
ttactattct ttttaaaaaa agtttcactg ngtaaaagaa catatttgcc taaacatang 480
tcaattatat gtctccatta naaaaaaata attggnaaac attgtctana actagttcca 540
aaataattaa gggggaaatc tntaatnttt ttaaagtgcc naaanaatgc ctaanttaaa 600
antt 604

<210> 497
<211> 587
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(587)
<223> n = A,T,C or G

<400> 497
acattaatga aatgtttcca aagaaatact gaacaatata tactctagtt tgctgaggtt 60
ccagctcgag ttcaaaccta attcttgtgc aataaaaatc agcatggatc ttagatgatc 120
tagaatacac tgtgttttga aatccacagc tggtttcatt tttaaccatt atgaaaaacc 180
agtacttttt tttttttttt tttttttttc nctnggacca taaattttta ttggcaggtc 240
aggaaaaaag ccgggggtaa gggtcccttc cttcccatcc ctctacccan aanacaccct 300
ccaaaggaca gcagaagccc cagagcctgc tgcctcagag gaccttggag gcagacaaat 360
tgttgtagng atcttcctgt ccctcaanca ggctgcggta ggtggnaatc tnctgctcca 420
gccgcgactt gatgtccatg aaccgctggt cctcggccgc gacaccctta nggcgaattn 480
caccnactgg gnggcgttct agtggatccg actcggacca acctngcgna atcatggcan 540
actggttnct gnnggaaatg gtttccctnc aattccccaa cataccn 587

<210> 498
<211> 354
<212> DNA
<213> Homo sapiens

<400> 498
acgcgggcaa taaagctaaa actcacctga gttgtaaaaa actccagttg acacaaaata 60
gactacgaaa gtggctttaa catatctgaa cacacaatag ctaagaccca aactgggatt 120
agataccccca ctatgcttag ccctaaacct caacagttaa atcaacaaaa ctgctcgcca 180
gaacactacg agccacagct taaaactcaa aggacctggc ggtgcttcat atccctctag 240
aggagcctgt tctgtaatcg ataaaccccg atcaacctca ccacctcttg ctcagcctat 300
ataccgccat cttcagcaaa ccctgatgaa ggctacaaag taagcgcaag tacc 354

<210> 499
<211> 632
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(632)
<223> n = A,T,C or G

<400> 499
nccgaggtac caactgcact cgttttggca ttgcagctaa atatcagttg gatcccactg 60
cttccatttc tgcaaaagtc aacaactcta gcttaattgg agtaggctat actcagactc 120
tgaggcctgg tgtgaagctt acactctctg ctctggtaga tgggaagagc attaatgctg 180
gaggccacaa ggntgggctc gccctggagt tggaggctta atccanctga aaagaaacct 240
ttgggaatgg atatcaaaag aattggcctt aatatatttc cattgngacc agcagcaggc 300
tttttttccc ccagaagatg atcaaaacaa aaggatgatc tcaacaagaa ctgtatttta 360
aagtatttaa ganagtcttt ggtaactngg ttctaagtng gtatctaatt acccaatgct 420
gcagtcctgc agtccctatt cattanttaa atgtatttaa ctggtaaatg ccctncccnc 480
cataatgaaa taganccttt ttgaaaaccc aaaaaaaaaa aaaaaaaaaa aaaaaagtcc 540
ctgcccggcc ggccctcaaa nggngaattc cannccctgg gggccgtact aanggatccn 600
cccggnccaa cttggggaat atgggntant gn 632

<210> 500
<211> 619
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(619)
<223> n = A,T,C or G

<400> 500
tccagcggnc cgccgggcng gtcatctata aaaggaaaag tgatggcatc tatatcataa 60
atctcaagan gacctgggag aagcttctgc tggcagctcg tgcaattgtt gccattgaaa 120
accctgctga tgtcagtgtt atatcctcca ngaatactgg ccaaanggct gtgctgaant 180
ttgctgctgc actggaacca ctccaattgc tggccgcttc actcctggaa ccttcactaa 240
ccagatcagg caaccttccg ggaccacggn ttnttgtggt tactgacccc aaggctgacc 300
accaacctnt cacggaggca ttttatgtta acctacctac cattgcgctg tgtaacacaa 360
gattcttctc tgcctatgtg gacattggca ttccatgcaa caaccaaggg gagctcactc 420
aatgggtttg atgtggtgga tctgctcggg naagtctgcg catgcctggc accatttccg 480
tgaacaccat ggagggatgc ctgattttac cttggccgga cacnctangg cgaattcacc 540
acttggngcc gtatantgga tccactcgga ccaacttggg naaaatggca naatnttccg 600
gggaaatgat ccctccaan 619

<210> 501
<211> 605
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(605)
<223> n = A,T,C or G

<400> 501
accacactga gatagtgttt gccaggacct cccctcagca gaagctcatc attgtggaag 60
gctgccaaag acagggtgct atcgtggctg tgactggtga cggtgtgaat gactctccag 120
ctttgaagaa agcaaacatt ggggttgcta tggggattgc tggctcagat gtgtccaagc 180
aagctgctga catgattctt ctggatgaca actttgcctc aattgtgact ggagtagagg 240
aaggtcgtct gatctttgat aacttgaaaa aatccattgc ttataccta accagtaaca 300
ttcccccgaga tcaccccgtt cctgatattt attattgcaa acattccact accactgggg 360

actgtcacca tcctctgcat tgacttgggc actgacatgg gtnctgccat ctcctggctt 420
atgagcaggc tggagggcat catgaanaaa cagcccaaaa tccaaacaga caacttgtga 480
atgancnggt gatcacatgg ctatggcaga atggatgatc nagncctggg aggttcttac 540
ttacttggaa tctgntgaaa cggttcttcc aatacctntt ggcctccatg gntggaanac 600
cctga 605

<210> 502
<211> 627
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(627)
<223> n = A,T,C or G

<400> 502
acatcttgct ggaaaatgct gcccagggct ctggagacgg tggctgcccg ggctcccttc 60
actgtccagg tcctgaaaga ctcttgttca tgaactgtct cttcacaaag caagtccacc 120
acttgctggg tttatcattc tgagggtcga aaactttctc acaaagtctc agtccagtct 180
cttgccttag ctgttgtaaa taggctctca tcacttcatc ttctgtttgt ttgcaggttt 240
ggcataaatt gcgttaagtg gaaaaccagg ctctccagga atgggaaaat taagtgattc 300
ccagcgtata catttctttc tcaccttggc ttttggaatt gcacttttgc agtttcttca 360
nacattcaga aatgtagaga gttatatata tcaangncct atcaacttca ttcttaattt 420
cataagtttt gaaaaaaaca ttggcccttg aagtaataaa tngntttatt cccaaaatct 480
ggatcntttg gcnctctngg ggcangnccc ttgaaatgac ttttgatagg gaacaangcc 540
ctggtttcca nnagnttggg ttcnggaccn taaaaaaaaa gggaanccgg nttttggngg 600
gcccggttta acccaagggc cggancn 627

<210> 503
<211> 629
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(629)
<223> n = A,T,C or G

<400> 503
ggtacattag tagagctctc caatcacagg cagacgccag tgtcctatga ccagggggca 60
aatatggcca aacagattgg agcagctact tatatcgaat gctcagcttt acagtcggaa 120
aatagcgtca gagacatttt tcacgttgcc accttggcat gtgtaaataa gacaaataaa 180
aacgttaagc ggaacaaatc acagagagcc acaaagcgga tttcacacat gcctagcaga 240
ccagaactct cggcagttgc tacggactta cgaaaggaca aagcgaagag ctgcactgtg 300
atgtgaatct ttcattatct ttaatgaaga caaaggaatc tagtgtaaaa aacaacagca 360
aacaaaaagg tgaagtctaa atgaagtgca cagccaaagt catgtatcca gaggcttang 420
aggcgtttga gangatactc atctttttgg aatnctgcct taggttcggc atgtanacca 480
agtgatgaga agtgaatcca tggaagagtt ttaatgtgac ttggaaaata tgccaaaaaa 540
tgagagatcc aataacttna ggaaaataag ggggatccaa tncctncccg gcggccctta 600
ggggaattca aacactnggg gcggtatan 629

<210> 504

<211> 462
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(462)
<223> n = A,T,C or G

<400> 504
acgcgggagc tgagtgtccc gcggggcccg aagcgtttac tttgaaaaaa ttagagtgtt 60
caaagcaggc ccgagccgcc tggataccgc agctaggaat aatggaatag gaccgcggtt 120
ctattttgtt ggttttcgga actgaggcca tgattaagag ggacggccgg gggcattcgt 180
attgcgccgc tagaggttaa attcttggac cggcgcaaga cggaccagag cgaaagcatt 240
tgccaagaat gttttcatta atcaagaacg aaagtcggag gttcgaagac gatcagatac 300
cgtcgtagtt ccgaccataa acgatgcccg accggcgatg cggcggcgtt attccatgac 360
ccgncgggca gcttccggga aaccaaagtc tttgggttcc ngggggagta tnggtgcaaa 420
aaaaaaaaaa aaaaaaaaaa gtcctnggnc gcgacccccct aa 462

<210> 505
<211> 628
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(628)
<223> n = A,T,C or G

<400> 505
actttttttt tttttttttt tttgggggag gttatatggg tttaatagtt tttttaattt 60
atttaggggg aatgatggtt gtctttggat atactacagc gatggctatt gaggagtatc 120
ctgaggcatg gggtcaggg gttgaggtct tggtgagtgt tttagtgggg ttagcgatgg 180
aggtaggatt ggtgctgtgg gtgaaagant atgatggggt ggtggttgtg gtaaacttta 240
atagtgtagg aagctgaata atttatgaag gagaggggtc agggttgatt cgggaggatc 300
ctattggtgc gggggctttg tatgattatg ggcgttgatt agtantaatt actggttgaa 360
cattgtttgt tggtgtatat attgnaattg agattgctcg ggggaatang ttatgtgatt 420
aggaataggg ttangatgag tgggaagaaa aaaagaaagg aantaaaagt ttaattattc 480
ccttttttggg ttgaagngat natggaaggg gaaaatttgg gccttgaaat tgtttaagta 540
atacttttct aataaggtaa gtctagaaga atagggcngg ttttggtctt aaaaaggcta 600
aaaggggatt ggcggggtgg atccnccc 628

<210> 506
<211> 612
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(612)
<223> n = A,T,C or G

<400> 506

acggtagaac tgctattatt catcctatgt gggtaattga ggagtatgct aagattttgc 60
cgtagctggg tttggtttaa tccacctcaa ctgcctgcta tgatggataa gattgagaga 120
gtggggagaa ggcttacgtt cagtgaggga gagatttggt atatgattga gatgggggct 180
agtttttgtc atgtgagaag aagcaggccg gatgtcagag gggtgccttg ggtaacctct 240
gggactcaga agtgaaaggg ggctattcct agttttattg ctatagccat tatgattatt 300
aatgatgagt attgattggt agtattggtt atggttcatt gccggagaag tatattgttg 360
aagaggatag ctattagaag gattatggat gccgttgctt gcctgaagaa atacttgatg 420
gcagcttctg tggaaccaag gtttattttt ttggntagaa ctggaataaa acctacatgt 480
ttatttctan gccactcagg taaaaaatca tgcnaactta acccttgata atgtgcctcc 540
aaaatgtaaa aaaataacgg ttggcccggg ataatcccgt ncttggccga ccccctaggn 600
aattcccccc tg 612

<210> 507
<211> 632
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(632)
<223> n = A,T,C or G

<400> 507
ggtactacgt tgtagcccac ttccactatg tcctatcaat aggagctgta tttgccatca 60
taggaggctt cattcactga tttcccctat tctcaggcta caccctagac caaacctacg 120
ccaaaatcca tttcactatc atattcatcg gcgtaaatct aactttcttc ccacaacact 180
ttctcggcct atccggaatg ccccgacgtt actcggacta ccccgatgca tacaccacat 240
gaaacatcct atcatctgta ggctcattca tttctctaac agcagtaata ttaataattt 300
tcatgatttg agaagccttc gcttcgaagc gaaaagtcct aatagtagaa gaaccctcca 360
taaacctgga gtgactatat ggatgccccc caccctacca cacattcgaa gaacccgtat 420
acataaaatc tagacaaaaa aggaaggaat cgaacccccc aaactgggtt nagccaaccc 480
catgggcttc acgacttttt tataaaaaaa aaaaaaaaaa aaaagtcctg gcccgggngg 540
cggtcanggn gaaattcaac nactgggngg cggtctaang ggtccaactc gggnccaacc 600
tgggggaaaa tgggaaagtg gttcctgggg aa 632

<210> 508
<211> 336
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(336)
<223> n = A,T,C or G

<400> 508
cggtcctcta atgctgctcn cccggccgca ntgtgattgg atatcttgca gaattcgccc 60
ttagcgtggt cgccgggccg aggtacaact tccaaaaagg agacattgga gaanaaccaa 120
gctgggtcta taaggaattg cacatgagat ggcacacata tttatgctgt ctgaaggnca 180
cgatcatgtt accatatcaa gctgaaaatg tcaccactat ctggagattt cgaccgtgtt 240
ttcctctctg aatctgttat gaacacnttg gttggctgga ttcantaata aatatgtaag 300
gcctttcttt tcaaaaaaaa aaaaaaaaaa aaaagt 336

<210> 509
<211> 624
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(624)
<223> n = A,T,C or G

<400> 509
ggtacttttt tttttttttt ttttttttta tagatacaat tggcttttat ttgtgattca 60
tgagtcaggg cagtttccat tctgcaaaat atagtgatag ctcctactgg gcaatacaac 120
agtanaacag tgggttttgt aaaatgggaa tccaggaaca gaagaatata aataaattga 180
tttaaataaa ctgattggtt aatttcagaa tacttcatat tactttttttc taagagttaa 240
agcagaaagg actttcttac tgtgctgact canacagcct ggactctcat gtttttagga 300
aaattttgct gttctgggat ctacctgctt cctcatgttt cagtgngagt atatggcatt 360
taacatgact ggctccattc tggagtccca ggctgtccct aaatgagaag ttgactaaac 420
ataaggnatt aacactactg ncaggtacca tcattttggc ttncatcatt catanggtat 480
gatgncccnc naatcatacc tttatttgag tttttgncat tccnncccaa aaaaaaaatt 540
ttgaanttta ccaaaggntg catgccacnt ttaaagggtt anaaaatcnc cccnccnggn 600
actaatnttg ggccatcngn nggc 624

<210> 510
<211> 619
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(619)
<223> n = A,T,C or G

<400> 510
acggatgcta cttgtccaat gatggtaaaa gggtagctta ctggttgtcc tccgattcag 60
gttagaatga ggaggtctgc ggctaggagt caataaagtg attggcttag tgggcgaaat 120
attatgcttt gttgtttgga tatatggagg atggggatta ttgctaggat gaggatggat 180
agtaataggg caaggacgcc tcctagtttg ttagggacgg atcggagaat tgtgtaggcc 240
aataggaaat atcattcggg cttgatgtgg ggaggggtgt ttaangggtt ggctagggta 300
taattgtctg ggtcccctaa gaggtctggt gagaatagtg ttaatgtcat taangagaga 360
aagaaaaaaa ataagcccga gggcgtcttt gattgtgtan taaaggtgga angtgatttt 420
atcngaatgg gaagtgattn ctaaggggtt ggtttgatcc ctttcgtgcc aaaataagaa 480
gnggaatgct gctagggctc cataatgaag gcaanataaa atgaaagnaa aaaatctgta 540
aggnnggact gctactaata ncctcccaaa tcttgaacaa gntttnccaa ttntggatgg 600
nggtataant tnaattcnn 619

<210> 511
<211> 634
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature

<222> (1)...(634)
<223> n = A,T,C or G

<400> 511
cgaggacgcg gggagatggc ctagaagcaa tgatagccat cactgagaac acctagcacc 60
caatcttggt tcctaatacc attctcccat caaaggaacc agagatcctt ggagaaatgg 120
ttaaggaatg aggcaggaaa tatacaagat aagcctggag catcttatag ctctagaaag 180
taagaaagta cctgcctatt ttagaatcct agagaacatt tcattgtaag aaactagccc 240
attatttaag tgtccacagt atttttcatt tcagtggtcc aagatgcgaa ggtttccaga 300
cacaatcttg ttctctaata ctgctccagg tgggatatca attctgtccc catgatttgc 360
aatgatgata cccgttccct ttaatgaaac atttttttnca aatgtcacat cttctgaaac 420
tgngaggnga tccaattcaa gcatatctgg gntactttcc aaatcntctt agataatctt 480
gaaccttcgt aaaagaactg gctaattaan ccanggccct gnaggaaatt cccctttttcc 540
tcattggcag ananccctgca ttaaantntt aagggttgnn ttnccnccan aaactgtgtg 600
gtttgnaggc aaaaaacggt cttgggcatt ancc 634

<210> 512
<211> 623
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(623)
<223> n = A,T,C or G

<400> 512
ggtacgcggg cattgttcat gactttaaca agaaacttac agcctattta gatcttaacc 60
tggataagtg ctatgtgatc cctctgaaca cttccattgt tatgccaccc agaaacctac 120
tggagttact tattaacatc aaggctggaa cctatttgcc tcagtcctat ctgattcatg 180
agcacatggt tattactgat cgcattgaaa acattgatca cctgggtttc tttatttatc 240
gactgtgtca tgacaaggaa acttacaaac tgcaacgcag agaaactatt aaaggtattc 300
agaaacgtga agccagcaat tgtttcgcaa ttcggcattt tgaaaacaaa tttgccgtgg 360
aaactttaat ttgtcttgaa cagtcaagaa aaacattatt gaggaaaatt aatatcacag 420
catacccccc cctttacatt ttgngcagng gatatttttt aaagcttctt tnatgtaagt 480
agcaacangg ntttactatc tttcatttca taaatcaatt aaancnttnc ctcaaaaaaa 540
aaaaaaaaaa aaaaatacct ncccggcggc gctccaaagg ggaattcaan caccggnggc 600
cgtctttggg accaacncgg gcc 623

<210> 513
<211> 623
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(623)
<223> n = A,T,C or G

<400> 513
actgccctct ccagatcagc agttcaggag agcacaggag gcaaaacaca gattgctggg 60
cttattggtg ccatcatcgt gctgattgtc gttctagcca ttggatttct cctggcacct 120
ctacaaaagt ccgtcctggc agctttagca ttgggaaact taaagggaat gctgatgcag 180

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tttgctgaaa taggcagatt gtggcgaaag gacaaatatg attgtttaat ttggatcatg     240
accttcatct tcaccattgt cctgggactc gggttaggcc tggcagctag tgtggcattt     300
caactgctaa ccatcgtgtt caggacccaa tttccaaaat gcagcacgct ggctaatatt     360
ggaagaacca acatctataa gaataaaaaa gattattatg atatgtatga gccagaagga     420
gtgaaaattt cagatgtcca tcttctatct actttgcnaa cattggnttc tttaggcngg     480
aacttatcga tgctggtngg ctttagtnca ctttgnaatt tacgcaagcc ccacaaactt     540
tgaggaaatc ccaaactgcn aancangntt nttcagtggt acccaanggt tttttttcct     600
tggcccgacn ccctangnga atn                                             623
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<210> 514
<211> 627
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(627)
<223> n = A,T,C or G

<400> 514

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ggtactcatg cccgactgtc taccaggcac acagactttg aggagagggc gtatgtcgtc      60
ttgatccgca tcaatgatgg gggtcggcca cccttggaag gcattgtttc tttaccagtt     120
acattctgca gttgtgtgga aggaagttgt ttccggccag caggtcacca gactgggata     180
cccactgtgg gcatggcagt tggtatactg ctgaccaccc ttctggtgat tggtataatt     240
ttagcagttg tgtttatccg cataaagaag gataaaggca aagataatgt tgaaagtgct     300
caagcatctg aagtcaaacc tctgagaagc tgaatttgaa aaggaatgtt tgaatttata     360
tagcaagtgc tatttcagca acaaccatct catcctatta cttttcatct aacgtgcatt     420
ataatttttt aaacagatat tccctcttgt cctttaatat ttgctaaata tttctttttt     480
gangnggagt cttgctctgt cgnccaagct ggantacctg ncccggccgg ccgtcaaagg     540
cgaattcaac aactggcggc cgtactaatg gatcgacctc ggaccaactt ggggaacatg     600
gcanactngt tcctgngnaa aggatcc                                         627
```

<210> 515
<211> 605
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(605)
<223> n = A,T,C or G

<400> 515

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accattggtg gccaattgat ttgatggtaa gggagggatc gttgacctcg tctgttatgt      60
aaaggatgcc gtanggatgg gagggcgatg aggactagga tgatggcggg caggatagtt     120
cagacggttt ctatttcctg agcgtctgag atgttagtat tagttaagtt ttgttgtgag     180
tgttaggaaa agggcataca ggactaggaa gcagataagg aaaatgatta tgagggccgt     240
gatcatgaaa ggtgataagc tcttctatga taggggaaag taancgtctt gtanacctac     300
ttgcgctgca tgtgccatcc cgccgtaccc taacccgtgc aaaggtagca taatcacttg     360
ttccttaatt aagggacctg tatgaatggc ttcaccaggg ttcaactgtc tcttactttt     420
aaccagtgaa attgacctgc ccctgaanag gcggcnttac acaccagacg agaaaacctt     480
tggagcttaa ttattatcca acatacctng ccggaccccc taaggcgaat tccaccactt     540
gcggcgtcta tggatccact cggaccactt ggggaaaagg ctactgtcct ggnaatgttt     600
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cctcn 605

<210> 516
<211> 464
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(464)
<223> n = A,T,C or G

<400> 516
ggtacaacta atccgtgaca aattaccaga ttaattttac tttatttctt caggcctggg 60
gtttttcgat gagttcaaat ttgggatctt caaatttgaa ggtgggaaat gtattcatgt 120
ctgcattacc aaacatttgc ttgagcttaa aaagctccct ctccagctct tgctgatact 180
ctgaactagc atcaacaggt cctccagatg tctgtcgctt agatttgtat tctctaatct 240
tgtccacaaa gagtttctgt ataggatcaa gttccttatt aaatgccact gctgtaacac 300
caatgttcct ccgcaaatgg actgagacgg ctgaccgaat gacagaggag aacctgaaga 360
gcctctgaag aatcatgctg attcttgcac tcagtcccga gctgncaaag ccttcgccgc 420
caccaccttc gntctacccc cgcgtacctg cccggcgggc gctc 464

<210> 517
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 517
acccggagca cggagatctc gccggcttta cgttcacctc ggtgtctgca gcaccctccg 60
cttcctctcc taggcgacga gacccagtgg ctagaagttc accatgtcta ttctcaagat 120
ccatgccagg gagatctttg actctcgcag gaatcccact gttgaggttg atctcttcac 180
ctcaaaaggt ctcttcagag ctgctgtgcc cagtggtgct tcaactggta tctatgaggc 240
cctagagctc cgggacaatg ataagactcg ctatatgggg aagggtgtct caaaggctgt 300
tgagcacatc aataaaacta ttgcgcctgc cctggttagc aagaaactga acgtcacaga 360
acaagagaag attgacaaac tgatgatcga gatggatgga acagaaaata aatctaagtt 420
tggtgcgaac gccattctgg gggtgtcctt tgccgtctgc naaactggtg ccgttgagaa 480
gggggtcccc tgtccttggc cggacacnct aaggcgaatt ccacacactg cggccgtact 540
atggatcgac tcggnaccaa cttgggtaat atgggcatac tggtnctggn gaaatgtttc 600
cctccaatcc a 611

<210> 518
<211> 435
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(435)

<223> n = A,T,C or G

<400> 518
cgaggtactt tnttttttt ttttttttt ttttaagagg aaaacccggt aatgatgtcg 60
gggttgaggg ataggaggag aatgggggat aggtgtatga acatgagggt gtttctcgt 120
gtgaatgagg gttttatgtt gttaatgtgg tgggtgagtg agccccattg tgttgtggta 180
aatatgtaga gggagtatag ggctgtgact agtatgttga gtcctgtaag taggagagtg 240
atatttgatc aggagaacgt ggttactagc acagagagtt ctcccagtag gttaatagtg 300
gggggtaagg cgaggttagc gaggcttgct agaagtcatc aaaaagctat tagtgggagt 360
agagtttgaa gtccttgaaa gaggattatg atgccactgt gaatgccttc ctagtttgag 420
tttgctagcc cgcgt 435

<210> 519
<211> 407
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(407)
<223> n = A,T,C or G

<400> 519
actttntttt ttttttttt ttttttttt ncagctttgc aaccatactc cccccggaac 60
ccaaagactt tggtttcccg gaagctgccc ggcgggtcat gggaataacg ccgccgcatc 120
gccggtcggc atcgtttatg gtcggaacta cnacggtntn tgatcgtntt cnaacctccg 180
actttcgttc ttgattaatg aaaacattct tggcaaatgc tttcgctctg gtccgtnttg 240
cgccggtcca anaatttcac ctctagcggc gcaatacnaa tgcccccggc cgtccctctt 300
aatcatggcc tcagttccga aaaccaacaa aataaaaccg cggtcctatt ccattatgcc 360
tagctgcggt atccaggcgg tccccggtac ctnggccgng accacgc 407

<210> 520
<211> 613
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(613)
<223> n = A,T,C or G

<400> 520
accttctggg gcatacaaca tggcagcagg gcctcgggaa gaggggtagg aggaccgagc 60
agcattctct gtagaggaag acaggaaagg agaccctctt ggcacacatt tatggagggt 120
tgtccctgaa gagaagggca ggtgggagag gttccctgtt acttaagaga aggcaccagt 180
ggcaaagagc acaatgaaga ggatgatgat aaaaacaatc acgcagataa ggacaatcat 240
cttcacgttc ttccaccaga atttcgagc caccttctgc gatgtcgtct tgaagtgctc 300
agatgtggct tccagatcct ctgtcttgtt gcggagatgt tccaagtttt ccccccgggc 360
caggatccgc tccacattct gggtcataat attcttaact ccctccacct cactttgcag 420
gttccgcaca cgatcatttc cttcaccttc actggcttnc tncatgtctc aaagcaccca 480
gccggcagta agtgaatcgc ctatcggntt cttccaggng ggcctanttn anttctggtg 540
gtcaactttc cccgcgtact tgggcggacc ccctaagggg aattcactgg cggccgtctt 600
tggatccacc cgn 613

<210> 521
<211> 606
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(606)
<223> n = A,T,C or G

<400> 521
actgcagtaa aagctttaac aggtggaatt gcccacttat tcaaacagaa taaggttgtt 60
catgtcaatg gatatggaaa gataactggc aaaaatcaag tcactgctac gaaagctgat 120
ggcggcactc aggttattga tacaaagaac attcttatag ccacgggttc agaagttact 180
ccttttcctg gaatcacgat agatgaagat acaatagtgt catctacagg tgctttatct 240
ttaaaaaaag ttccagaaaa gatggttgtt attggtgcag gagtaatagg tgtagaattg 300
ggttcagttt ggcaaagact tggtgcagat gtgacagcag ttgaattttt angtcatgta 360
ggtggagttg gaattgatat ggagatatct aaaaactttc aacgcatcct tcaaaaacag 420
gggtttaaat ttaaattgaa tacaanggta ctggtgctcc aagaagcana tggaaaaatt 480
gatgttctat tgaanctctt ttgngggaaa gctgaantnt acttggatgn cctnggccgn 540
acncnctagg caatccncca ctggngccnt ntttggtccn cctggtccaa ctgggnnann 600
nggctn 606

<210> 522
<211> 617
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(617)
<223> n = A,T,C or G

<400> 522
acttgcgctt actttgtagc cttcatcagg gtttgctgaa gatggcggta tataggctga 60
gcaagaggtg gtgaggttga tcggggttta tcgattacag aacaggctcc tctagaggga 120
tatgaagcac cgccaggtcc tttgagtttt aagctgtggc tcgtagtgtt ctggcgagca 180
gttttgttga tttaactgtt gaggtttagg gctaagcata gtggggtatc taatcccagt 240
ttgggtctta gctattgtgt gttcagatat gttaaagcca ctttcgtagt ctattttgtg 300
tcaactggag ttttttacaa ctcangtgag ttttagcttt attggggagg gggtgatcta 360
aaacactctt tacgccggct tctattgact tgggttaatc gtgtgacccg cggtggctgg 420
cacgaaattg accaaccctg gggttagtat aacttaatta aactttcntt attgctnaag 480
gtaatcctgg tggttnccct gggggngtng ntaggctaaa cgtttgaacc tcattctgcg 540
gcctganctt ggccctttta tcgggggatt aaaaggggac tncttgaacn gggngcttct 600
tggnaaatta taaaaca 617

<210> 523
<211> 608
<212> DNA
<213> Homo sapiens

<220>

<221> misc_feature
<222> (1)...(608)
<223> n = A,T,C or G

<400> 523
cgaggtactt tttttttttt tttttttttt ttttggaana agtaagcctt tatttccttg 60
ttttgcaaat aaaactggct aagttggttg ctttttggtg attaagtcaa aganaccaaa 120
tcccatatcc tcgtccgact cctccgactc ttccttggct tcaaccttan ctggggctgc 180
agcagcagca ggagcagctg tggtggtagc aaccacaggg gcagcancca caaaggcaga 240
tggatcaacc aanaaggcct tgaccttttc aacaagtggg aaggngtaat ccgtctccca 300
aacaaagtca ggactcgttt gtctcttcaa aaaaaaaaag cganggctcg catttggtcc 360
cctttggaca ttttgcaact cttcaatggg gttncattgg tnggtgatgg tataaacctt 420
tgangnacct gcccggccgg ccgtcaaang gcaaattcac ccactggcgg ccgttctatg 480
gatccnaccc ggncccaact tgggtaatat ggcanactgt tcctggggga aatgtntccc 540
tnaaattccc acaaanacaa nccgaaccta aangtaancn gggggccaag agggcnaccn 600
ccttattg 608

<210> 524
<211> 398
<212> DNA
<213> Homo sapiens

<400> 524
ggtacaggat cctctaaaga gaccgcctgg ctgggtgctc aaaccacatg ggccgaccca 60
aaagacgtca aaaccaagag ctgctcagga ggcactaaat gttgacggtc ttggccggct 120
tcacatcctc aatttcagca gacagccagc ggtaagtgcg atgacgccgc agcacctcaa 180
tggccttgag ttccagtggt gttgcctgaa taccaaggtc ttctaagcca ggcaggtgag 240
gcaatttcat gtctgtgatg tgcatccgct ccactttatc ccttgttatc cagggctcaa 300
atgggcttat ttcaaagact cttgctaccc atcgataggc aaaaagcggc aaggggaatg 360
ggaggaacaa tctgtgagcc acaacaaaga tgtacctg 398

<210> 525
<211> 607
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(607)
<223> n = A,T,C or G

<400> 525
actgttcctg ttggcccgag tggagactgg tgttctcaaa cccggtatgg tggtcacctt 60
tgctccagtc aacgttacaa cggaagtaaa atctgtcgaa atgcaccatg aagctttgag 120
tgaagctctt cctggggaca atgtgggctt caatgtcaag aatgtgtctg tcaaggatgt 180
tcgtcgtggc aaccgttgct ggtgacagca aaaatgaccc accaatggaa gcagctggct 240
tcactgctca ggtgattatc ctgaaccatc caggccaaat aagcgccggc tatgcccctg 300
tattggattg ccacacggct cacattgcat gcaagtttgc tgagctgaag gaaaagattg 360
atcgccgttc tggtaaaaag ctggaaaatg gccctaaatt cttgaaatct ggtgatgctg 420
ccattggtga tatgggtcct ggcaagccca tgtgtgtttg agagcttctc aaactattca 480
ccttgggtcc tttgctgtcg tgatatgaaa aaacagtgcg gggtgtatc aaacatggac 540
aaaagnttnt tgacttgcag gtaccaattt nccaaaacta aaaggtnaan aaatttncca 600
aaccgcc 607

<210> 526
<211> 624
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(624)
<223> n = A,T,C or G

<400> 526
cgaggtacgc gggggaagct ctgtttggtg ctttggatcc atttccatcg gtccttacag 60
ccgctcgtca gactccagca gccaagatgg tgaagcagat cgagagcaag actgcttttc 120
aggaagcctt ggacgctgca ggtgataaac ttgtagtagt tgacttctca gccacgtggt 180
gtgggccttg caaaatgatc aagcctttct ttcattccct ctctgaaaag tattccaacg 240
tgatattcct tgaagtagat gtggatgact gtcaggatgt tgcttcagag tgtgaagtca 300
aatgcatgcc aacattccag ttttttaaga agggacaaaa ggtgggtgaa ttttctggag 360
ccaataagga aaagcttgaa gccaccatta atgaattagt ctaatcatgt tttctgaaaa 420
tataaccagc ccattggcta tttaaaactt gtaatttttt taatttacca aaatntaaaa 480
tntgaagacn taacccagtt gncatctgcg tgacaatnaa acattaatgc tacactttta 540
aaaaaaaaaa aaaaaaaaaa gtcctgccng cggccctcaa aggggaattc cacacctggg 600
ggccgtcttt nggncccacc cgnn 624

<210> 527
<211> 611
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(611)
<223> n = A,T,C or G

<400> 527
acagagtgac actgaacaga tcacaaagca cgagaaacat tagttctctc cctccccagc 60
gtctccttcg tctccctggt tttccgatgt ccacagagtg agattgtccc taagtaactg 120
catgatcaga gtgctgtctt tataagactc ttcattcagc gtatccaatt cagcaattgc 180
ttcatcaaat gccgtttttg ccaggctaca ggccttttca ggagagttta gaatctcata 240
gtaaaagact gagaaattta gtgccagacc aagacgaatt gggtgtgtag gctgcatttc 300
tttcttacta atttcaaatg cttcctggta agcctgctgg gagttcgaca cagtggtttg 360
tttgttgctc cagatgccac ttcagaaaga tcctaaaata atctcctttc attttcaagt 420
agaacacctt actttctggt tgtgtagcat tgggaataaa atatttgtcc acagcttcag 480
aacatcattg cagatgtcct gcagtctggc tntatctttt acggnacctc ggccgggaca 540
ccctanggcg aattccacac ctggcggccg tctantggac ngctnggcca cttgggnana 600
tggctactgt t 611

<210> 528
<211> 615
<212> DNA
<213> Homo sapiens

<220>

<221> misc_feature
<222> (1)...(615)
<223> n = A,T,C or G

<400> 528
ggtacttttt tttttttttt ttttttttga gacggagtct tgttcagctg cccaggctgg 60
agtgcagtgg ctcgatcttc gctcactgca accaccgtct cctgggttca agcgattctc 120
ctgtctcagc ctcccaagta gctgggatta caggccacca ccatcatgcc cggctaattt 180
ttgtatattg gtagagacgg agtttcacta tgttgggcag gctggtcttg aactcctcac 240
ctcaggtgat ccgcccgtct tggcctccca aagtgctagg attacaggcg taagccacca 300
tgcctggcca gatgatgtat ttaaatatca taccaaactc tgtgtattta tataaagaaa 360
gactggtaaa agacttcctn attttaaaaa aaaccaaaac ccaaaccaaa aaaaacttta 420
cccttaccat tgntgcatat tgtgcagtat aaaacacaca cttattngga catganaaaa 480
ccgnaagaaa gncccgggta aactggactt tgccgccttt aaaaataaaa tcnaataagn 540
gccttgaggc ccttttcaa tgcaattttt taacccggac ctgccnggng gcggtaaggg 600
naatccancn ctggn 615

<210> 529
<211> 352
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(352)
<223> n = A,T,C or G

<400> 529
cgaggtactt tnttttttttt tttttttttt tttttgggaa aagtcatgga ggccatgggg 60
ttggcttgaa accagctttg gggggttcga ttccttcctt ttttgtctan attttatgta 120
tacgggttct tcgaatgtgt ggtagggtgg ggggcatcca tatagtcact ccaggtttat 180
ggagggttct tctactatta ggacttttcg cttcgaagcg aaggcttctc aaatcatgaa 240
aattattaat attactgctg ttagagaaat gaatgagcct acagatgata ggatgtttca 300
tgtggtgtat gcatcggggt agtccgagta acgtcggggc attccccgc gt 352

<210> 530
<211> 769
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(769)
<223> n = A,T,C or G

<400> 530
ggtactgcat agattaaaga aataaactgc agtaaagcca ctcgtaagga atgaacgcca 60
ttgccaatga taatcctctg cacataggtg gaaatagcaa agaagtatag ttgcttcaga 120
acaggtaata accaaaatga taaacaccag aaataggaag ccaaacatgt aatacatctg 180
gtgtgaccaa atactattca gaatgaagaa aagttgtata aagatgcagc caaagggcaa 240
aatccctccc atgataatac caggcaaggg cttcgtgtag aacgactgtt caggaatctg 300
acngtggaat ctgattggtt cgaactgggt gttcaatggc atcttcttaa aaccaangta 360
tgcaccaata aacgtcnnag gcacagatat gtanaccaaa gggccaatat ggcaancagt 420

gtncccaaaa gaaatactgt tgganatcct ctncccagag gtcagattnt tattaagaat 480
cnccccgcgt cttttttttg tttttttttt gctccacttt nnggtaaann acntttnttt 540
aaaaatgttt aantctantt cctaattccc atnttctttn gctncnnnnc tgctggnggn 600
ctttaaggga antcnccnnt ggnggcgtcn atganccact tgnnactggn tantagcnac 660
gttcgggang ttcccncntt ctaatatccg gnagtaannc ggctttgncn cctantggnn 720
cngcttttcg aacntgcctn anannntccg gaggtgtatn ttcttctnn 769

<210> 531
<211> 777
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(777)
<223> n = A,T,C or G

<400> 531
cgaggtactt tttttttttt tttttttttt tgtttttttt tttttttctt cagctaaaac 60
agcggaagag gtgatttatt atatggttgt tacactcggc cacaaataaa cacagaaata 120
gtccanaatg tcacaggtcc aggacagagg accaacatgg gcattttgtt tatgagcaag 180
gtgggtctna naggtgatcg gcgatcagag ggcgatgaag ttctagatcc attgagacaa 240
gctctagaca gtagcatgca gtcccacaac ttgtctccaa agattcaggt ttactcacgt 300
catccagcan agaatggaaa gtcaaatttc ctgaattgct atgtgtctgg gtttcatcca 360
tccgacattg aagttgactt actgaanaat ggagagagaa ttgaaaaant nggacattca 420
taactgnntt tcancaagga ctggtctttc tatctcttgg ncttnntttt tcttntattt 480
tttttntaca tngggcctta ctttaaaaac atacntttcc nnnttacncn tggatgccaa 540
tngatttcna nanatttccn agnggaatcc tttngttatt nttaaaantt gggatctntn 600
gccancactt ggctaantnt taccnncttt nggaatngtc ntatgntcat tnttggaaat 660
tncccccctn angnntttct ttnngngnta aaaattntta atnnttaaat tnttttttcna 720
anattnntca aatactaana ntnntnnggg nttanannaa tnntgtanat gggnnng 777

<210> 532
<211> 764
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(764)
<223> n = A,T,C or G

<400> 532
actttacaag atagattgta taagaagcca aataatgaaa gcctagaaaa aactaattta 60
tacttatctg aaggttacaa attagacttt taaattttct ttgtagttgg tggtgtttga 120
gggttggcta gaaatgaaag cctggatttt gtgccatgtt tgtaatatag tttgttcctt 180
gatcaaataa tcagagaaaa gaaacttaaa gatctttgtc tgtgaagaag aaaattatct 240
ccctagttca atctgtagtg aaataagact acagaaggca ttgtttttc ctttttattt 300
tntgnattat atatttttct taaatatgtt ttattgtctt ctctaagcaa aaagttctta 360
ataaacatag tatttctctc tgcgtcctat ttcattagtg aagacatagt tcacctaaaa 420
tggcatnctg ctctgaatct agctttttat aaatggctat gtttttgatg atatgtcaca 480
ttcaaaatgg cctaattaaa tgtgttaaat gnaatggcac tcttataacc ttaaaataac 540
canaattaac cctccaaaaa aanaaaaaaa aaaaaggcct tggccgacnc ntangngant 600

caccnctgng gcntcatgga cncttggcca cttgngaann nggtnangnt ccggganatt 660
tccccatncc aattcancgg acatagnnac cnggccnaag ngnnccantg nngnnnnnct 720
tnnngaacng gccctnaacn cccggggngg tngttcnccc tcnc 764

<210> 533
<211> 773
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(773)
<223> n = A,T,C or G

<400> 533
cgaggtactt tttttttttt ttttacagat acaattggct tttatttgtg attcatgagt 60
cagggcagtt tccattctgc aaaatatagt gatagctcct actgggcaat acaacagtag 120
aacagtgggt tttgtaaaat gggaatccag gaacagaaga atataaataa attgatttaa 180
ataaactgat tggttaattt cagaatactt catattactt ttttctaaga gttaaagcag 240
aaaggacttt cttactgtgc tgactcagac agcctggact ctcatgtttt taggaaaatt 300
ttgtctgttc tgggatctac ctgcttcctc atgttcagtg tgagtatatg gcatttagca 360
tgactggtcc attctggagt caccaggctt gcacctaaat gagagttgac taancatagg 420
cnttaacact actgcagtac catcatttng acttcatcat catanggtat gatgncntct 480
aatnttncat tatttgagtt tggcattcag ccacgagaga atattgcctt tgacaatgnt 540
gcatgcaact ttaaaggttt tagatncgcc nccnggnact atttnngaaa tcgggggtcc 600
cccnanttgg agtttnacct ggcngaccnn tgacnaccat taaggantgt tagantnccc 660
ttgaaccccc tttacaccnt ttgnatttcc cggcntaacc ccgggcnnta agggatccnt 720
tggcntnngg cccngcnatn gaagnacntt ngannacgcc tccncaccan nng 773

<210> 534
<211> 730
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(730)
<223> n = A,T,C or G

<400> 534
acacagacaa atttatgcga ccagggcaga ggctgtagat gattcatatt tccaattggg 60
agggaggact cgcttggtct tataatatcg agccaaacgg tgaatccggc tctctattag 120
aatcagacgg aatttagcat ccttatcctt tctgttcctc tcaagatgct ttcgaacagc 180
aactgctttc ttaattaaat ggtagagatc ttcaggaaga tcaggagcaa gtcccttaga 240
cttaagaatt cttaaaattt tattgcctgt cacaaaacgt acaaattgac caggctgttg 300
acggctgcct ccacgtcggt ggaataattc tgacgaatct gggagctcat ggttggttgg 360
caagaaggag ctaccacaaa aacngtgctg caggtccaga agcaggagat ggccgaaaaa 420
tgtccccgaag ttcaaccgag aggaaatcga ggcggccgag cttgaagaag tcccgattgt 480
tcgtcaacct gtgaacagaa caaccccgga ccgcnantgc ccggtnctgg ccggacacct 540
angggaatcn accctgnggc gtctangacc acttggccaa ctggganntg gaaatntccg 600
ggaaagntcn tcaatcccaa ttaccgacna agaactgggc naagggtcnc atatgggcnc 660
gccttnnnga nctnccctta anncccсgga gggtgntggn tctcntctan nntnnngtgg 720
nggnnaanag 730

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<210> 535
<211> 809
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(809)
<223> n = A,T,C or G

<400> 535
gcgtggtcng cggccgaggt accaactgca gagccaggaa aactttgaag ccttcatgaa     60
ggcaatcggt ctgccggaag agctcatcca gaaggggaag gatgtcaagg gggtgtcgga    120
aatcgtgcag aatgggaagc acttcaagtt caccatcacc gctgggtcca aagtgatcca    180
aaacgaattc acggtggggg aggaatgtga gctggagaca atgacagggg ataaagtcaa    240
gacagtggtt canttggaag gtgacaataa actggtgaca actttcaaaa acatcaagtc    300
tgtgaccgaa ctcaacggng acataatcac caataccatg acattgggtg acattgtctt    360
caagagaatc agcangagaa tttaaacaag tctgcatttc atattatttt antgntgtaa    420
aattaatgta attaaagtga actttgttta aaaaaagann nntnntntaa atanaaaaaa    480
gtncctgcct ggcggccggt caaaggccaa ttccagcnac tngnggccnt actagtgatc    540
nactcgtcna acttgcgtaa nntggcatac ttgtnctngg taaatntatc cctcncatcn    600
ccaaattcnn ccgagcttaa atntaaactg gggcctatag gnncactcct tttggttgcn    660
ctgccnttnn acgaacttcg nccctttat antgcccccc ganagggtng tttggctttc     720
ntnntatatt ctctctctcc ttgnnggttt ttanggtngg tcatntgggn tctntanttt    780
agcttngaan ntantngntn tttnttnnt                                      809

<210> 536
<211> 755
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(755)
<223> n = A,T,C or G

<400> 536
actttttttt tttttttttt tttttttttt atgaggaaaa cccggtaatg atgtcggggt     60
tgagggatag gaggagaatg ggggataggt gtatgaacat gagggtgttt tctcgtgtga    120
atgagggttt tatgttgtta atgtggtggg tgagtgagcc ccattgtgtt gtggtaaata    180
tgtagaggga gtatagggct gtgactagta tgttgagtcc tgtaagtagg agagtgatat    240
ttgatcagga gaacgtggtt actagcacag agagttctcc cagtaggtta atagtggggg    300
gtaaggcgag gttagcgagg cttgctagaa gtcatcaaaa agctattant gggagtanag    360
tttgaagtcc ttgagagagg attatgatgc nacttgtaat gcnttcgant ttgagtttgc    420
tagcngaata nnatgaggat gtantccngg gccaatatna aaatactccc cgtnaacttn    480
aggggttnga taaaatgctg tctacccnng actttgccgn acaccttagg caattcanca    540
ctggngccgt ctnanggncc cacttggncc acnttggnga acatggcnnc ngtcntngga    600
aatgtttcnt caattcccnc ttcnaccgan tantgnaacn ggggcanaag cncccatatn    660
gtccctccct tctngaactt nnccnttaaa tncccccgga gggttnatgg ctttctctnc    720
taananntnt tnngnggnnt tcnataanna taann                               755

<210> 537
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<211> 794
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(794)
<223> n = A,T,C or G

<400> 537
cgaggtacga aagggacaag agaaataagg cctacttcac aaagcgcctt cccccgtaaa 60
tgatatcatc tcaacttagt attataccca cacccaccca agaacagggt ttgttaaaaa 120
aaaaaaaaaa aaaaaaaaaa aaaaaagtac cttgactttg ttcacagcat gtagggtgat 180
gagcactcac aattgttgac taaaatgctg cttttaaaac ataggaaagt agaatggttg 240
agtgcaaatc catagcacaa gataaattga gctagttaag gcaaatcagg taaaatagtc 300
atgattctat gtaatgtaaa ccagaaaaaa taaatgttca tgatttcaag atgttatatt 360
aaagaaaaac tttaaaaatt attatatatt tatagcaaaa gttatcttaa atatgaattc 420
tgttgtaatt taatgctttt gaatacagag atntaaatga agtattatct gtaaaaatgt 480
atattagagt tgtgatacag agtatatttc attcanccat nttcatacta ataatatgga 540
tttaaanata tcctataaat tcnaattcaa nanaaannnt gntananaan aanggnctgn 600
cggcggcgca nggcaattca acaatgnggc gtctanggac nactggtcca cttgggaana 660
ggcaacttnc tgggaatgat ccttcattcc canntaccna gctanttaac nggggcaaag 720
ggcccnntta tgggnntngc ntntnnaant tgcccttaaa accccggngg gtgntggntc 780
tttnnnntttn ngnt 794

<210> 538
<211> 766
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(766)
<223> n = A,T,C or G

<400> 538
ggtacgcggg ggaaggcctt ccttttcgt ctgggctgcc aacatgccat ccagactgag 60
gaagaccccgg aaacttaggg gccacgtgag ccacggccac ggccgcatag gcaagcaccg 120
gaagcacccc ggcggccgcg gtaatgctgg tggtctgcat caccaccgga tcaacttcga 180
caaataccac ccaggctact ttgggaaagt tggtatgaag cattaccact taaagaggaa 240
ccagagcttc tgcccaactg tcaaccttga caaattgtgg actttggtca gtgaacagac 300
acgggtgaat gctgctaaaa acaagactgg ggctgtccca tcattgatgt ggtgcgatcg 360
gctactacaa agttctggga aagggaaagc tccaaagcaa nctgtcatcg tgaaggccaa 420
atcttcacag aagagctgag gagaaaaata agantgttgg ggggcctgtg tctggtgctt 480
gaagcccatt ganggagttt aattaatgct actcttttga aaaaaanann aananaaaaa 540
gacctgcccg gcggcngtaa ggcaattcac cnttgngccg tctaaggacc actggccaan 600
tgggaanang gcnaanntcc tgggaatngt tcntcaattc cccaattaac caanaangna 660
acnngggcca nnnggcaccc ttatggntcc ctnccttng gaactngcct tttaatccnc 720
cngagggtnt tgctccttnt ntttntgnnt ggggtaatna aaagtn 766

<210> 539
<211> 789
<212> DNA

<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(789)
<223> n = A,T,C or G

<400> 539
accattggtg gccaattgat ttgatggtaa gggagggatc gttgacctcg tctgttatgt 60
aaaggatgcg tagggatggg agggcgatga ggactaggat gatggcgggc aggatagttc 120
agacggtttc tatttcctga gcgtctgaga tgttagtatt agttagtttt gttgtgagtg 180
ttaggaaaag gcatacagga ctaggaagca gataaggaaa atgattatga gggcgtgatc 240
atgaaaggtg ataagctctt ctatgatagg ggaagtagcg tcttgtagac ctacttgcgc 300
tgcatgtgcc cccgcgtact tgactttctt ttntatttnt tttattnttt ttgactactt 360
agaattttca caattctaat aagattgttc caagtctctc atgtgcaagc tttaaaggat 420
gactcttgcc atttatgtac ctcggncgcg accacgctaa gggcaaattc agcacacttg 480
cggncgttct aagtggatcc nagctcggtc caaccttgcg tatcatggca tactggtccc 540
tngtgaaatg tatcccttac aatcncacac atcnancccg aanctaaann taaanctggg 600
gccaataata ctactncata atgctcnctn ctgccnttca ncnggaacnt gtgcncttnt 660
tatnatggca acncggaagn gtggttggcc ttcctctcta aaacntgnng gntngttgga 720
aggganctct aggnnncggt ccaattggan ncgaaattnt agctntntac naaanatntt 780
tttttcncg 789

<210> 540
<211> 747
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(747)
<223> n = A,T,C or G

<400> 540
acttttaagg gcataataag ggttaacatt ctaggcagta taaacacacc ccataatgca 60
agtaataggt aatctagaga tgtggacttt attgctatat gggaattaca tttaaatttg 120
agggcatttt atataaagaa aaatacagac ctataaagtt tggcatattc attaagttat 180
cttttaatat ttttttctag aaaacaggtg acatttgtat ctacgataaa aatttttata 240
cagaacctac tgcctcaaac tgaatcccat caagaaaact agtttctatt gnattaagta 300
actcaaaata aattatcact tcgaaaactt gctttccaca ctaaggtaag tcagactaga 360
tgaacactcc agaattttta ctacagactg ttttaagtta gaagtgatgg caatttataa 420
attgagaata tcctccctga tgccctaact ggccaaacca aaatctaaga aagcagtgac 480
ncctcttact atnatgaact tctgaatang gtagggacct cctggcntan nnatgaaaan 540
ncctggccga ccccctaggg aatccncact gggggcctnn anggaccnan tggccaantt 600
gnnanngggn aangnncctg gnaatgtccn caattcncna atnccgncna aagtaacngg 660
gcccnggggn annnnnangn ngncnnccnn nnngaannng cccttnaann ncccgngggg 720
ggngggntct nnncnnnncc nnngggg 747

<210> 541
<211> 773
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(773)
<223> n = A,T,C or G

<400> 541
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cgaggtacca tgaaatacat atatttcata aggttcagtt acaaaatgga ttgtttcaaa     60
tggcaatttc ttacactaac ctgattatga aaaaaagaag tctgtatcat ctgcttccaa    120
gtctgttatg tccaaatata ttttaattat gcatttattt tgctactttt ataaatatta    180
gagatttcac cttaaattat ttttgtaact agttctagaa catgttttcc aattattatt    240
tttctaatgg agacatataa ttgacctatg tttatgcata tatgttctct acacagtgaa    300
actttttta aaaagaatag taaagaaaat gcggaagctc tggctctcca aggcaaagtc     360
aaaaaaaaaa aaaaagcggg ggggaatgcg aggaacattt tattacacct cctgatttca    420
ctccttgagt ttattttctc ccttggttat tggttaatgc tagaaactgn attctaagag    480
agcatccttt tcaggtgacn tgataattgg aagatttgat ccttccgcga cctgnccggc    540
ggccgtcnaa nggcnattcc anccactggc ggcggtctaa nggatcnact tggnccacct    600
ggctaactgg caacnggtcc ngggngaaat gnatccttaa atccncactc nacccgacct    660
aangaactgg ggcaagggnc accctatggn gctcngcctt cnngaantnn ccnncttaan    720
aaccnggggn gntggnntct nnnnnannnn cnnnntgngg gnntaanaag ann           773
```

<210> 542
<211> 770
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(770)
<223> n = A,T,C or G

<400> 542
```
cgaggtactt tttttttttt tttttttttt ttttttttag aattctgaat tttattagag     60
aatatatcta aaatacaata tttattaagt tatgatatat tgnctgaatg gaaatatact    120
ctgnatcgca actctaatta taacaatttt tacagataat acttcattta tatctctgna    180
attcaaaagt cattaaatta caacagaatt catatttaag ataactttgc tataaatata    240
taataatttt taaagttttt ctttaatata acatcttgaa atcatgaaca tttatttttt    300
ctgggttaca ttcatagaat catgactatt ttacctgatt tgccttaact agctcaattt    360
atcttggcta tggatttgca ctcaccattc tactttccta tgtttaaaag cacattttag    420
tcacaattgn gagtgctcat caccctacat gctgtgacaa aggcaagggc ctgcccgggc    480
ggccgtncaa anggcgaatt ccncaactgg cggcggtcca agtggancga ctcggaccaa    540
ctngggaaca tggcaactgg tcccggggaa atggaaccgt acattcccca natcagccga    600
ncttaggtaa acngggggcn aagggggcta cncataatgg nggtccnccc ttcatngaac    660
cgngccctnn tatnatgcac cccggagggt nnttngcctc ctcntnnnnn ntcngntgtg    720
gagggagtcc ngggggtnc cangggggna aaaantgccn ngncccggng                770
```

<210> 543
<211> 748
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(748)

<223> n = A,T,C or G

<400> 543
accgcgggat gcccctcatt tacataaata ttatactagc atttaccatc tcacttctag 60
gaatactagt atatcgctca cacctcatat cctccctact atgcctagaa ggaataatac 120
tatcgctgtt cattatagct actctcataa ccctcaacac ccactccctc ttagccaata 180
ttgtgcctat tgccatacta gtctttgccg ctgcgaagca gcggtgggcc tagccctact 240
agtctcaatc tccaacacat atggcctaga ctacgtacat atgctaggcc atatggtaac 300
tctatgttta acattttgag gaactgccaa actgttttcc aaagtgacta cactatttta 360
cattcccacc ttgaaggtcc aatttctcga cattctacca acatgggtaa tggctgcttt 420
ttatttagca accttaatgg gtgtgaagag atactcaatg ggaatttgat tgattcccta 480
angctaatga tttggnttct ttctggctga ngccagagnt atctntttgg gaaaattatt 540
naancttgnc atttaacnng cngatttatn tgatntanaa tnttntattt gganccngcc 600
tttaagnaag nttaaaattn ncaatnttgg ggcttncttt tggccatgan naannttaat 660
nntannanna attnnntncn annnggcnng tnaannannn nnnanaaana annnttnnna 720
anaannactt tttnnnnnna cntggcgg 748

<210> 544
<211> 327
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)...(327)
<223> n = A,T,C or G

<400> 544
actttttttt tttttttttt tttttttttt tttttttttt ttggctctag agggggtaga 60
gggggtgcta tagggtaaat acgggcccta tttcaaagat ttttagggga attaattctg 120
ggacgatggg catgaaactg tggtttgctc cacagatttc anagcattga ccgtagtata 180
cccccggtcg tgtagcggtg aaagtggttt ggtttaaacg tccgggaatt gcatctgttt 240
ttaagcctaa tgtggggaca gctcatgagt gcaagacgtc ttgtgatgta attattatac 300
gaatgggggc ttnaatcggg agtacct 327